VEHUB4YOU
VIRTUAL YOUTH BUSINESS HUBS INTERNATIONAL NETWORK

MONOGRAPH

ECONOMIC BEHAVIOR AND THE FORMATION OF BUSINESS THINKING AMONG YOUNG PEOPLE IN INTERNATIONAL VIRTUAL EXCHANGES: BEST PRACTICES IN ONLINE EDUCATION

MİNGƏÇEVİR DÖVLƏT UNİVERSİTETİ

RISEBA UNIVERSITY OF APPLIED SCIENCES Business • Arts • Technology

KEY KYIV EDUCATION, TRAINING AND YOUTH CENTRE

UNIVERSITÀ DI FOGGIA

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

UDC 37.013:330

Reviewers:
Nadiia Shmygol – D.Sc. (Economics), Professor, Institute of Production Systems Organization, Faculty of Mechanical and Industrial Engineering, Warsaw University of Technology, Warsaw, Poland;
Snezana Bilic – Ph.D. in Management, Full Professor, Faculty of Economics and Administrative Sciences, International Balkan University, Skopje, North Macedonia.

Recommended for publication by the Science Council of Kyiv National University of Technologies and Design, October 22, 2025.

Economic Behavior and the Formation of Business Thinking among Young People in International Virtual Exchanges: Best Practices in Online Education: Monograph / Edited by Prof. Dr. Sc. Oleksandra Olshanska, Prof. Dr. Sc. Olena Cherniavska, and Prof. Dr. Sc. Alla Kasych. - Kyiv: Kyiv National University of Technologies and Design, 2025. - 435 p.

Contributors: Olena Cherniavska, Oleksandra Cherniavska, Alla Kasych, Olena Yarish, Gunel Karimli, Babak Husuyev, Pierpaolo Magliocca, Anna Roberta Gagliardi, Olexandra Olshanska, Olena Vartanova, Natalia Bugas, Svitlana Bebko, Aida Mustafayeva, Samira Ahmadova, Svitlana Bondarenko, Mariana Shkoda, Zaur Rasulov, Farah Jalil, Ulviyya Verdiyeva, Tetiana Tsalko, Svitlana Nevmerzhytska, Olena Hryhorevska, Arif Kalasho.

The authors bear full responsible for the text, quotations and illustrations.

Annotation: This collective monograph reports results of the international project ERASMUS-EDU-2021-VIRT-EXCH VEHUB4YOU project INTERNATIONAL NETWORK OF VIRTUAL YOUTH BUSINESS HUBS. It brings together theoretical, empirical, and methodological contributions from researchers in Ukraine, Switzerland, Italy, and Azerbaijan, examining the formation of economic behavior, development of entrepreneurial thinking, virtual entrepreneurship, digital literacy, and the socio-cultural effects of online education. A dedicated focus is the VEHUB4YOU model, which shows how virtual exchanges enhance international collaboration, inclusion, and sustainable pathways to youth employability and entrepreneurship, in line with the European Education Area and the Digital Education Action Plan 2021–2027. The monograph targets scholars, educators, policymakers, and practitioners in educational innovation and digital transformation, serving as both a research resource and a methodological guide for designing, managing, and evaluating virtual learning environments that integrate economic education with sustainable and inclusive practices.

UDC 37.013:330

CONTENT

INTRODUCTION

In the twenty-first century, higher education stands at the crossroads of global transformation, where digital acceleration and socio-economic instability redefine not only learning environments but also the very logic of economic and entrepreneurial agency. In this shifting landscape, the international project VEHUB4YOU: Virtual Business Hubs for Young People (Erasmus+ Programme, ERASMUS-EDU-2021-VIRT-EXCH) emerges as a pioneering response to the call for inclusive, transnational, and innovation-driven educational ecosystems. This collective monograph brings together theoretical reflections, empirical findings, and institutional practices from participating countries - Ukraine, Switzerland, Italy, and Azerbaijan - and aims to conceptualize how virtual exchanges transform education into a shared infrastructure for economic awareness, civic responsibility, and entrepreneurial empowerment.

The significance of this research derives from the convergence of three critical dynamics.

First, the global digital transition has dismantled traditional spatial and temporal constraints of education. Virtual exchanges, once perceived as supplementary, now serve as autonomous ecosystems that shape values, decision-making patterns, and professional identities among young people. They provide a field for experiential learning, where entrepreneurial and economic behaviors evolve through collaboration, experimentation, and intercultural dialogue.

Second, the study resonates with the strategic frameworks of the European Union, particularly the Digital Education Action Plan 2021–2027, the European Skills Agenda, and the European Education Area. These policy architectures emphasize digital inclusion, innovation in learning, and the development of entrepreneurial mindsets as prerequisites for sustainable growth. VEHUB4YOU operationalizes these principles through a network of Virtual Business Hubs, enabling learners to act as co-creators of solutions rather than passive recipients of knowledge.

Third, the initiative holds particular importance for Ukraine and Azerbaijan, countries of the Eastern Partnership, where educational modernization is closely

intertwined with socio-economic recovery, digital transformation, and integration into European and global knowledge networks. In the Ukrainian context, virtual exchange offers continuity of learning and international cooperation under conditions of war and displacement, ensuring youth participation in Europe's intellectual and entrepreneurial fabric. In Azerbaijan, it contributes to the diversification of economic pathways, the strengthening of youth innovation capacity, and the alignment with national education strategies (2022–2036) that promote digital literacy and sustainable entrepreneurship.

Thus, the monograph addresses a critical policy and institutional gap - demonstrating how European and national priorities can be translated into scalable, evidence-based practices of international collaboration.

The aim of this collective work is to conceptualize and empirically validate the mechanisms through which international virtual exchanges - institutionalized in the form of Virtual Youth Business Hubs - foster the development of economic behavior, entrepreneurial thinking, and transnational collaboration among youth.

To achieve this aim, the authors pursue the following objectives:

– To reinterpret economic and entrepreneurial behavior in the context of digital globalization and post-pandemic transformation;

– To examine the theoretical and institutional evolution of virtual exchange as an educational innovation;

– To articulate the design logic, organizational models, and pedagogical mechanisms underpinning the VEHUB4YOU initiative;

– To document and analyze best practices, regional case studies, and empirical outcomes from participating countries;

– To identify key factors influencing digital inclusion, cross-cultural learning, and gender-sensitive participation;

– To propose a framework for evaluating the long-term educational and socio-economic impact of virtual business hubs;

– To align project-based insights with the European and national strategies for education, innovation, and sustainable development.

The monograph builds upon an interdisciplinary theoretical foundation, integrating perspectives from educational sciences, management, behavioral economics, and digital transformation studies.

The conceptual framework draws upon:

– Constructivist and activity-based learning theories, emphasizing agency, co-creation, and reflection;

– Transformative and distributed mentorship models, focusing on collective problem-solving and cross-sector learning;

– Platform governance and ecosystem theories, which frame education as a network of interoperable infrastructures rather than isolated institutions;

– Behavioral economics and human capital theory, which elucidate how digital collaboration shapes motivation, decision-making, and value orientation;

– Evaluation-through-change logic, linking the inputs, processes, and impact of virtual exchanges.

Methodologically, the monograph employs mixed approaches: comparative institutional analysis, case studies, design-based research, and empirical evaluation of project outcomes, complemented by qualitative reflections from participants and educators.

The research novelty lies in its integrated vision of virtual exchange as a transformative infrastructure for economic and entrepreneurial education. Specifically, the monograph:

– Introduces a typology of third-generation virtual exchanges, shifting from cultural understanding to transformative economic agency;

– Develops the VEHUB4YOU model as a scalable educational ecosystem connecting universities, schools, NGOs, and businesses;

– Proposes an evidence-based framework for evaluating virtual hubs' efficiency, inclusivity, and sustainability;

– Identifies mechanisms of semantic interoperability and distributed mentorship as the foundation of digitally mediated entrepreneurship education.

The findings of this monograph have broad practical implications. For educational institutions, they provide a roadmap for integrating virtual exchanges into curricula, quality assurance systems, and strategies of internationalization. For policymakers, the results serve as a reference for developing governance instruments that recognize virtual exchange as a legitimate form of mobility and entrepreneurship training.

For teachers and facilitators, the book offers pedagogical models for engaging youth in project-based, intercultural, and digitally enabled learning. Finally, for students and young professionals, it demonstrates pathways toward self-organization, cross-border cooperation, and civic engagement within the European knowledge economy.

The VEHUB4YOU initiative and its accompanying research are grounded in ethical principles of voluntary participation, inclusivity, and academic integrity. All empirical data were collected with informed consent, ensuring confidentiality, respect for diversity, and compliance with the Erasmus+ Code of Conduct. The monograph acknowledges the diversity of linguistic, cultural, and institutional contexts among partner universities, treating them not as limitations but as sources of epistemic richness.

The volume consists of seven interrelated chapters, each addressing a distinct dimension of the VEHUB4YOU initiative:

Chapter 1 explores the conceptual and institutional rationale of the VEHUB4YOU project, tracing the evolution of virtual exchange as a mechanism of economic and entrepreneurial learning.

Chapter 2 provides theoretical foundations for understanding economic behavior and entrepreneurial thinking, integrating human capital perspectives and globalized education paradigms.

Chapter 3 presents best practices and managerial insights from the organization of virtual business hubs, identifying critical success factors and operational challenges.

Chapter 4 contains regional case studies from Italy, Ukraine, and Azerbaijan, illustrating how national contexts shape implementation models.

Chapter 5 analyzes the socio-cultural and digital dimensions of participation, including cross-cultural learning, inclusivity, and digital competence development.

Chapter 6 focuses on assessment and evaluation methodologies, presenting participant feedback, success indicators, and long-term educational outcomes.

Chapter 7 outlines the future of virtual exchange in higher education, linking globalization, institutional transformation, and new strategies for digital university branding.

Together, these chapters form a coherent research narrative - from conceptual grounding and empirical demonstration to forward-looking reflection - showing how virtual exchange ecosystems can reconfigure higher education into a domain of shared innovation, sustainable entrepreneurship, and inclusive digital citizenship.

CHAPTER 1
CONTEXT AND RATIONALE OF THE VEHUB4YOU INITIATIVE - RETHINKING ECONOMIC BEHAVIOR AND BUSINESS THINKING FORMATION THROUGH INTERNATIONAL VIRTUAL EXCHANGES

1.1 Context and Rationale: Rethinking Economic Behavior Through International Virtual Exchange

In the unfolding landscape of global education, the proliferation of virtual exchange practices has marked not a marginal shift, but a paradigmatic realignment in how economic behavior and entrepreneurial cognition are cultivated among youth. While traditional approaches have historically tethered the development of economic thinking to classroom simulations or localized case studies, the digital turn - accelerated by necessity during the COVID-19 pandemic and sustained through strategic educational policies - has reconstituted these practices into borderless, collaborative, and culturally entangled forms of engagement (O'Dowd, 2018; Rubin, 2016).

The VEHUB4YOU initiative, situated within this broader epistemic transition, emerges not as an isolated intervention but as a response to a dual imperative: firstly, to democratize access to entrepreneurial learning by embedding it into rural, under-resourced, and post-conflict educational systems; and secondly, to engineer institutional environments capable of sustaining digitally mediated, cross-border co-creation in economic and business education (Cherniavska et al., 2024). Its architecture - involving seventy virtual business hubs across schools, universities, and libraries in Ukraine and Azerbaijan - constitutes a hybrid model of participatory digital pedagogy and applied entrepreneurial learning, infused with sociocultural relevance and infrastructural pragmatism.

This monograph - Economic Behavior and the Formation of Business Thinking Among Young People in International Virtual Exchanges - is not merely an account of implemented practices but a theoretical and evidence-based reflection on the new logic

of economic behavior formation within distributed digital ecosystems. It seeks to capture the layered dynamics of how young people engage with entrepreneurial tasks, interpret business scenarios across cultures, and embody socio-economic agency through virtual environments.

More specifically, this volume addresses four interlinked questions:

1. How is economic behavior constructed in non-formal, digitally mediated international learning settings?

2. What theoretical models best capture the emergence of entrepreneurial thinking among youth in transnational virtual contexts?

3. What forms of pedagogical redesign are necessary to support this emergent behavior sustainably?

4. How can these insights be transferred to educational systems with diverse socio-political and infrastructural constraints?

In alignment with these aims, the project serves as both a research field and a living laboratory, contributing to a re-theorization of digital entrepreneurship education by integrating interdisciplinary perspectives - including cognitive constructivism (Bruner, 1966), distributed mentorship (Feldon & Litson, 2020), intercultural competence (Deardorff, 2006), and ecosystemic learning theory (Bronfenbrenner, 1979; Bateson, 1972).

The monograph also functions as a contextual reply to the EU's strategic ambitions under Digital Education Action Plan 2021–2027 and European Skills Agenda, specifically the commitment to developing entrepreneurial and digital skills through innovative, inclusive, and internationally integrated approaches (European Commission, 2020). Project operationalizes these ambitions in non-Western contexts, rendering the project not a peripheral adaptation, but a contributory node in a distributed European innovation infrastructure.

The theoretical exposition, empirical insights, and methodological tools presented in this volume are thus intended to:

– Inform future Erasmus+ and Horizon Europe projects in virtual mobility and entrepreneurship;

– Guide national education policymakers in Ukraine, Azerbaijan, and beyond on scalable digital transformation models;

– Support academic institutions seeking frameworks for integrating international virtual exchanges into business education.

In subsequent sections, we unpack the historical evolution of virtual exchange (1.2), trace the institutional design logic of project (1.3), present evidence-based pedagogical and policy findings and conclude with theoretically integrated insights for future transformations (1.4).

The formation of economic behavior - understood as the cognitive, affective, and performative orientation toward resource management, decision-making, and entrepreneurial risk - is increasingly shaped not within bounded institutions but within digitally distributed environments. This challenges the classical models of economic socialization rooted in household structure (Becker, 1993), schooling systems (Bowles & Gintis, 1976), and national labor markets (Esping-Andersen, 1990), and demands a turn toward situated learning theory (Lave & Wenger, 1991) and distributed cognition (Hutchins, 1995) as epistemological foundations.

VEHUB4YOU aligns with this shift by constructing learning environments as ecosystems where entrepreneurial cognition is co-produced through interaction with peers, mentors, digital infrastructures, and institutional cultures. The business hub becomes not a delivery point of knowledge but a nodal site of knowledge creation, deeply embedded in community realities and responsive to market uncertainties. In such environments, learning is contingent on context, negotiation, and action - what Vygotsky (1978) conceptualized as the Zone of Proximal Development, expanded through peer collaboration and scaffolding tools.

Moreover, methodological architecture operationalizes the distributed mentorship model (Ito et al., 2019), whereby students gain guidance from a multiplicity of sources - local entrepreneurs, diaspora investors, peer learners, digital coaches - integrated into a flexible, translocal pedagogical matrix. This contrasts with the dyadic student–professor model and repositions mentorship as an ecosystemic function, structurally embedded in the learning process itself.

The sociopolitical backdrop of project, particularly its deployment in Ukraine and Azerbaijan, cannot be abstracted from the educational objectives it serves. In Ukraine, the ongoing war and displacement of youth have severely disrupted educational continuity and labor market orientation. In Azerbaijan, regional disparities and urban–rural divides persist in limiting equitable access to entrepreneurial knowledge and financial skills.

Under these conditions, virtual exchange and digital entrepreneurship hubs function as adaptive governance mechanisms (Lægreid & Christensen, 2007), capable of reconnecting dislocated learners with economic agency and intercultural capital. The VEHUB4YOU model, with its integration of NGOs, rural libraries, and vocational schools, exemplifies how education systems in crisis can reorganize themselves through platform logic - decentralized, interoperable, and participatory.

In doing so, the project contributes to the resilience discourse in education (OECD, 2021), where capacity-building is measured not only by technological access but by the development of adaptive, future-proof business thinking among the next generation of entrepreneurs.

The digitalization of entrepreneurial learning in the project also raises fundamental questions about the economic topology of knowledge: Who produces it, how is it transferred, and what value does it create in local communities? Drawing on the notion of distributed educational economies (Peters, 2010), this monograph conceptualizes virtual business hubs as micro-economic learning infrastructures, where the circulation of ideas, skills, and partnerships generates economic imaginaries that are both localized and globally intelligible.

These transformations, while pedagogical in appearance, are fundamentally institutional redesigns that challenge the dichotomies of formal vs. informal learning, teacher vs. peer instruction, and local vs. international entrepreneurship. VEHUB4YOU does not merely operate within these binaries - it systematically dissolves them by structuring pedagogical continuity through semantic interoperability (Janssen et al., 2020), intercultural empathy, and business realism.

1.2. Evolution of Virtual Exchange and the Rise of VEHUB4YOU

The concept of international exchange in education has historically taken various forms - from correspondence-based pen pal programs in the early 20th century to immersive cultural visits and bilateral study abroad agreements in the late 1990s (Kinginger, 2009). These models were built upon the premise that intercultural understanding could be cultivated through temporary physical displacement - mobilizing learners into foreign contexts to experience the other. While pedagogically potent, these models have long been exclusionary: economically inaccessible for most, logistically rigid, and structurally dependent on institutional privilege (O'Dowd, 2018).

The emergence of telecollaboration - a term popularized in the 1990s - signaled a new phase in international educational exchange, grounded in the use of digital technologies to foster cross-border dialogue and project-based collaboration (Belz & Thorne, 2006). Initially used in language education, telecollaboration gradually expanded into intercultural training and joint problem-solving projects. Programs such as Global Learning Circles (Riel, 1993) and Etwinning under the European Commission exemplified this digital turn, albeit within relatively homogeneous school networks.

The advent of virtual exchange (VE) as a formal educational category, supported by institutions such as the Erasmus+ Virtual Exchange program and UNIMED, marked a shift from bilateral digital dialogues to multilateral, structured and curriculum-integrated collaborations (Helm, 2020). VE became not only a tool for cultural exposure but a mechanism for delivering discipline-specific competencies (e.g., business, sustainability, digital citizenship) and experimenting with inclusive pedagogies.

The conceptual trajectory of virtual exchange programs in international education has undergone a significant transformation over the past two decades. This transformation, while heterogeneous in implementation, can be analytically segmented into three distinct generations, each characterized by a dominant pedagogical logic, institutional design, and socio-educational aim. This section proposes a typology

rooted in educational theory and empirical observation to distinguish these generations: (1) Cultural Understanding, (2) Skill Co-Development, and (3) Transformative Economic Agency (see Table Generations of Virtual Exchange).

Generation 1: Cultural Understanding. The first generation of virtual exchange was premised on the moral imperative of intercultural empathy and mutual understanding. Grounded in the pedagogical frameworks of contact theory (Allport, 1954) and intercultural competence development (Deardorff, 2006), these early programs sought to bridge cultural divides through dialogue, often in language-based environments. Initiatives such as eTwinning, Global Pen Pals, and the Erasmus+ Intercultural Dialogues exemplified this model. While often transformative on the interpersonal level, these exchanges operated largely outside curricular structures and lacked measurable outcomes in terms of socio-economic empowerment.

Generation 2: Skill Co-Development. The second generation, catalyzed by developments in experiential learning (Kolb, 1984) and the COIL model (Rubin, 2017; O'Dowd, 2018), shifted focus to structured, task-based collaboration across institutions. Virtual exchange became an instrument for the acquisition of transversal competencies - such as digital literacy, problem-solving, and teamwork - mapped against global employability frameworks (Crawford et al., 2020; Swartz & Luck, 2020). Programs such as Erasmus+ Virtual Exchange and various UNICollaboration initiatives began embedding these projects into formal curricula, often at the university level. The pedagogical emphasis moved from affective engagement to cognitive co-production, albeit still within an elite academic context.

Generation 3: Transformative Economic Agency. The emergence of a third generation of virtual exchange is defined by a paradigmatic shift toward distributed educational agency, economic empowerment, and institutional redesign. In this model, virtual exchange is not merely an educational technique, but a systemic vector for socio-economic transformation, particularly in underserved or peripheral regions. Projects such as VEHUB4YOU embody this evolution by integrating entrepreneurial learning, digital hub infrastructures, and intersectoral partnerships into the educational process.

Drawing on theories of transformative learning (Mezirow, 1997), capabilities approach (Sen, 1999; Nussbaum, 2011), and ecosystemic pedagogy (Beigel et al., 2022), the third generation redefines learners not just as participants in intercultural dialogue, but as co-creators of economic and social value. Such models are typified by their inclusion of non-traditional actors - rural libraries, community organizations, and SMEs - and their anchoring in local development agendas aligned with the UN Sustainable Development Goals (Ferreira-Lopes & Elexpuru-Albizuri, 2022; Cherniavska et al., 2024).

In contrast to the transient nature of earlier virtual exchange formats, this generation aims for structural embedding, institutional replication, and scalability, offering robust frameworks for national policy adoption and long-term curricular reform.

Table 1.1. Generational Evolution of Virtual Exchange Models: From Intercultural Dialogue to Transformative Economic Agency

Generation	Main Focus	Pedagogical Structure	Typical Institutions	Examples
Gen 1: Cultural Understanding	Intercultural dialogue, empathy, mutual understanding	Dialogue-oriented, often language-based exchanges	Universities and secondary schools in Europe and North America	Etwinning, Global Pen Pals, Erasmus+ Intercultural Dialogues
Gen 2: Skill Co-Development	Project-based learning, skill building, collaborative tasks	Curriculum-integrated, task-oriented modules	Cross-disciplinary university consortia	Erasmus+ Virtual Exchange, UNICollaboration projects
Gen 3: Transformative Economic Agency	Entrepreneurial thinking, socio-economic empowerment, institutional innovation	Ecosystem-based, co-designed learning infrastructures	Rural schools, libraries, NGOs, and underrepresented educational actors	VEHUB4YOU, Digital hubs in Eastern Partnership & Southern Neighbourhood

Source: Constructed by the author as part of the VEHUB4YOU project analytical framework.

In conceptualizing the theoretical foundation of VE, scholars have increasingly integrated perspectives from:

– transformative learning theory (Mezirow, 1991), focusing on perspective transformation through intercultural reflection.

– intercultural communicative competence (Byram, 1997; Deardorff, 2006), emphasizing attitudes, knowledge, and skills required for successful interaction.

– experiential entrepreneurship education (Fayolle & Gailly, 2008), highlighting the role of context and real-world engagement in entrepreneurial mindset formation.

The VEHUB4YOU initiative represents a convergent evolution, embedding intercultural collaboration within structured business challenges, thus producing what may be termed an entrepreneurial virtual exchange. In contrast to VE formats that prioritize discursive or debate-based exchange, project emphasizes co-production of knowledge, problem-solving with local embeddedness, and simulation of entrepreneurial agency across different socioeconomic contexts.

This hybridization of intercultural learning and entrepreneurial task engagement situates approuch at the intersection of digital pedagogy, economic education, and regional development strategies - a positioning that few VE models to date have systematically realized.

Three innovations distinguish project within the lineage of VE:

1. Bottom-Up Infrastructure Building: Unlike VE models that operate within existing universities, VEHUB4YOU creates infrastructure in non-traditional venues (e.g., rural libraries, vocational schools, youth NGOs), thus redefining the locus of economic learning.

2. Inclusive and Distributed Co-Creation: Each virtual hub operates under principles of semantic and pedagogical decentralization, allowing adaptation of content to local realities while maintaining interoperable frameworks - particularly in sustainability, finance, and entrepreneurship.

3. Strategic Role of Eastern and Post-Soviet Contexts: it foregrounds Ukraine and Azerbaijan not as recipient nations but as innovation contributors, developing practices

with potential transferability to other Southern Neighbourhood and Sub-Saharan Africa regions.

Thus, VEHUB4YOU may be seen as a third-generation virtual exchange model - moving from cultural understanding (Gen 1), to skill co-development (Gen 2), to transformative economic agency (Gen 3), with structurally embedded mechanisms for sustainability and replication.

The VEHUB4YOU initiative serves as a paradigmatic example of third-generation virtual exchange, functioning not merely as a set of digital encounters but as a platform for distributed entrepreneurship and systemic reconfiguration of learning environments. Its design principles, implementation geographies, and stakeholder logic exemplify a shift from episodic intercultural engagement to durable, place-sensitive, and innovation-driven educational infrastructures.

At the core of VEHUB4YOU lies a distributed agency model, whereby youth from economically and geographically marginalized regions - notably in Ukraine and Azerbaijan - are positioned not as passive recipients of knowledge, but as co-designers and co-implementers of entrepreneurial solutions. This aligns with the capability approach to education, wherein learning is not judged solely by attained competencies but by the real freedoms individuals possess to pursue life trajectories they value (Sen, 1999; Nussbaum, 2011).

Moreover, it introduces the concept of ERASMUS-EDU-2021-VIRT-EXCH VEHUB4YOU project INTERNATIONAL NETWORK OF VIRTUAL YOUTH BUSINESS HUBS as institutional prototypes - modular, replicable, and context-responsive structures that interlink pedagogical content, digital facilitation, and real-world economic challenges. The hubs are grounded in the principle of situated learning (Lave & Wenger, 1991), where entrepreneurial thinking is developed through authentic community engagement and task-driven mentorship.

This model also redefines the ecosystem boundaries of virtual education, integrating rural libraries, youth organizations, and regional development stakeholders into what might be conceptualized as a micro-regional innovation hub, echoing the principles of inclusive systemic innovation (George et al., 2012).

Table 1.2. Structural Features of VEHUB4YOU Virtual Exchange Model and Their Theoretical Grounding

Dimension	Structural Feature	Theoretical Foundation
Design Architecture	Modular virtual hubs embedded in existing institutions	Design-Based Research; Institutional Layering
Curricular Approach	Entrepreneurship education across disciplines	Interdisciplinary Pedagogy; Transversal Skills Frameworks
Stakeholder Logic	Multi-sectoral co-creation (schools, NGOs, SMEs, universities)	Quadruple Helix Innovation Model (Carayannis & Campbell, 2009)
Technological Mediation	Virtual exchanges via asynchronous and synchronous platforms	Media Ecology; EdTech Integration Frameworks (Luckin, 2010)
Evaluation	Participant feedback, challenge-based outcomes	Theory of Change; Outcome-Oriented Evaluation

Source: Constructed by the author as part of the VEHUB4YOU project analytical framework.

In this respect, VEHUB4YOU addresses not only educational but also structural inequalities by providing:

- institutional anchors for long-term capacity building;
- methodologies for pedagogical adaptation in low-infrastructure settings;
- strategies for linking learning-to-earning trajectories across borders.

As such, VEHUB4YOU does not merely participate in the evolution of virtual exchange; it reconfigures its ontological status - from dialogue facilitation to economic infrastructure, from intercultural learning to localized development intervention.

While many virtual exchange initiatives remain episodic or confined to single academic cycles, VEHUB4YOU distinguishes itself by introducing replicable, policy-aligned, and digitally anchored mechanisms for institutional sustainability. In this context, its significance transcends project-based innovation and aligns with the broader quest for adaptive governance in education (Kuhlmann et al., 2019) and the formation of semantic infrastructures for international cooperation (Janssen et al., 2020).

The institutionalization pathways pursued by VEHUB4YOU unfold across three interlinked domains:

1. Organizational Anchoring. VEHUB4YOU is not solely embedded in universities but strategically distributed across libraries, vocational schools, rural NGOs, and youth organizations. This horizontal anchoring ensures that institutional memory and infrastructural logic outlive the project lifecycle. These hubs function according to the logic of organizational isomorphism (DiMaggio & Powell, 1983), adapting their forms to local conditions while maintaining coherent governance and learning protocols through shared design standards.

This design facilitates local capacity building, whereby teachers and local facilitators are trained to operate and expand hub activities without continued external support. In Ukraine, for instance, rural schoolteachers were upskilled in virtual moderation, entrepreneurship education, and youth mentoring, thus creating a meso-layer of entrepreneurial pedagogy distributed beyond economic faculties or business schools.

2. Policy Integration. Through its engagement with ministries of education and regional authorities, VEHUB4YOU generates pathways for policy translation, allowing outcomes to be embedded in curricular updates, accreditation schemes, and teacher training protocols. This aligns with theories of policy borrowing and lending (Steiner-Khamsi, 2004), where local innovations are adapted across contexts not by replication but by contextual hybridization.

Policy frameworks emerging from the VEHUB4YOU experience propose:

- integration of business challenges into the national curriculum for civic education;
- accreditation of virtual exchange experiences as extracurricular competencies;
- inclusion of NGOs as recognized providers of entrepreneurial learning content.

These dynamics position ***VEHUB4YOU as a living policy laboratory, contributing to structural reform in education ecosystems in the Global East and beyond.***

3. Digital Interoperability and Platform Transferability. Unlike siloed online education initiatives, VEHUB4YOU was built on principles of semantic interoperability and low-code digital modularity. This ensures that its platform components - training modules, interaction templates, mentor directories, challenge repositories - can be localized, translated, and recombined without loss of systemic logic.

The project's digital backbone is designed for horizontal scalability. It can be implemented by other institutions in Southern Neighbourhood and Sub-Saharan Africa regions, particularly where traditional infrastructures are lacking but mobile connectivity is rising. This aligns with resilient digital infrastructure theory, where sustainability depends on adaptability, localization, and open access (Berdou, 2020).

Table 1.3. VEHUB4YOU's Institutional Logic: Mechanisms of Replication and Sustainability Across Systemic Domains

Institutional Domain	Mechanism for Replication & Sustainability	Theoretical Reference
Organizational	Horizontal anchoring in schools, libraries, NGOs	Organizational Isomorphism (DiMaggio & Powell, 1983)
Policy	Policy translation and hybridization with national curricula	Policy Borrowing (Steiner-Khamsi, 2004)
Technological	Semantic interoperability, low-code digital modules	

Source: Constructed by the author as part of the VEHUB4YOU project analytical framework.

1.3 Theoretically Grounded Solutions of VEHUB4YOU: Institutional Redesign of Virtual Exchange in Response to Systemic Challenges

In contrast to earlier stages of virtual exchange development - largely characterized by dialogue-oriented and culturally symbolic practices - the VEHUB4YOU project introduces a model of embedded educational entrepreneurship,

conceptually rooted in ecosystem theory, transformative learning, and spatial inclusion frameworks. This section offers a theoretically grounded analysis of how VEHUB4YOU addresses systemic challenges in youth business education and international virtual collaboration through institutional innovation, infrastructure co-creation, and adaptive pedagogy.

Across post-Soviet and emerging economies, entrepreneurial education has long suffered from institutional fragmentation, restricted primarily to urban universities and seldom reaching secondary-level learners in under-resourced contexts. In such environments, knowledge flows are often siloed, with minimal interaction between formal curricula, non-formal learning actors, and labor market institutions.

VEHUB4YOU addresses this fragmentation by employing the Quadruple Helix Innovation Model (Carayannis & Campbell, 2009), reconceptualizing entrepreneurial learning as a co-created interinstitutional ecosystem involving schools, libraries, NGOs, and business chambers. By structurally integrating civil society into the educational framework, the project dissolves sectoral boundaries and establishes multi-actor youth business hubs that function simultaneously as learning platforms, innovation incubators, and community development instruments.

This model resonates with literature emphasizing entrepreneurial ecosystems not as isolated firm-level interventions, but as relational infrastructures that facilitate collective value creation (Stam, 2015; Isenberg, 2010).

Traditional approaches to entrepreneurship education in many participating countries focus on declarative knowledge, often delivered via static lectures, case studies, or generic business plan templates. These approaches insufficiently equip learners to navigate volatile and digitally mediated market conditions.

Informed by Transformative Learning Theory (Mezirow, 1991) and expanded through Distributed Mentorship models (Hamilton et al., 2021), VEHUB4YOU replaces unidirectional knowledge transmission with collaborative business ideation processes grounded in local relevance and youth agency. This shift is pedagogically anchored in constructivist paradigms (Piaget, 1950; Vygotsky, 1978), which

emphasize active knowledge construction through social interaction, self-reflection, and contextualized problem solving.

Each hub becomes an experimental site where youth explore entrepreneurial thinking through iterative prototyping, digital storytelling, community engagement, and intercultural peer exchange, thereby embodying learning as situated practice (Lave & Wenger, 1991) rather than isolated content acquisition.

A core theoretical innovation of VEHUB4YOU lies in its capacity to distribute educational capital spatially, inverting conventional center–periphery hierarchies in educational access. The project deliberately situates many of its hubs in rural libraries, community centers, and secondary schools, asserting a principle of spatial justice (Soja, 2010) in educational innovation.

Rather than treating rural regions as passive recipients of metropolitan expertise, VEHUB4YOU mobilizes their embedded social capital as assets for entrepreneurial activation. Drawing on capillarity theory in regional development (Rodríguez-Pose, 2013), the project's spatial configuration enables the percolation of innovation beyond core urban nodes, thereby contributing to territorially balanced educational ecosystems.

Educational innovations often fail to scale due to over-specialization, lack of transferability, and cultural rigidity. VEHUB4YOU addresses this challenge through a platform-based logic of modularity, where pedagogical content, technical infrastructure, and institutional formats are designed for recombination and contextual adaptation.

This approach aligns with platform governance theory (Williamson et al., 2022), which views educational tools not merely as content repositories but as governable interfaces enabling coordinated action among diverse actors. VEHUB4YOU's open access learning materials, digital templates, and challenge formats embody this logic, supporting a scalable and interoperable model for entrepreneurship education across geographies and sectors.

To consolidate, VEHUB4YOU may be analytically situated at the convergence of four strategic transformations, each rooted in a coherent theoretical framework (Table 1.4).

Table 1.4. Synthesizing the Redesign Logic of VEHUB4YOU: Theoretical Anchors and Operational Mechanisms

Systemic Challenge	Theoretical Model	VEHUB4YOU's Operational Mechanism
Sectoral and institutional fragmentation	Quadruple Helix Innovation (Carayannis & Campbell, 2009)	Multi-actor entrepreneurship hubs in diverse institutions
Outdated pedagogy and rigid curricula	Transformative Learning (Mezirow, 1991); Constructivism	Youth-driven, challenge-based co-creation processes
Urban–rural asymmetry in access	Spatial Justice (Soja, 2010); Capillarity Theory	Rural library and school-based hubs for inclusive education
Scalability and sustainability limits	Platformization (Williamson et al., 2022)	Modular, open-source educational and mentoring ecosystems

Source: Constructed by the author as part of the VEHUB4YOU project analytical framework.

These embedded theoretical choices distinguish VEHUB4YOU as more than an educational intervention; rather, it emerges as a model of institutional transformation in the emerging domain of distributed entrepreneurial education.

1.4 Evidence-Based Findings and Best Practices: From Experimental Modalities to Structurally Embedded Virtual Exchange Mechanisms

The analysis of recent scholarly literature and institutional reports converges on the recognition that virtual exchange (VE) initiatives are no longer peripheral or complementary educational tools but have evolved into structurally embedded modalities of skill co-development, intercultural engagement, and entrepreneurial capacity-building (O'Dowd, 2018; Ferreira-Lopes & Elexpuru-Albizuri, 2022; Withanachchi & Sreesing, 2022). Within this trajectory, the Erasmus+ VEHUB4YOU project represents a generational shift - from traditional dialogue-centered exchanges

to programmatic mechanisms of distributed economic agency, with a focus on replicability, equity, and systemic inclusion.

Empirical studies consistently highlight several domains in which VE programs generate demonstrable outcomes. These include (1) intercultural competence; (2) global employability and digital literacies; (3) equity in access to international learning; and (4) civic and entrepreneurial agency. Theoretical grounding is provided by frameworks such as Deardorff's intercultural competence model, Kolb's experiential learning theory, and the COIL methodology for collaborative project-based learning. These frameworks serve not only as interpretative tools but also as pedagogical architectures within which exchange tasks are structured and evaluated (Swartz & Luck, 2020; Ferreira-Lopes et al., 2021).

At the level of implementation, VEHUB4YOU demonstrates methodological innovations that directly respond to the operational challenges documented in the literature - time zone misalignments, digital infrastructure asymmetries, and curriculum incoherence (Velinov & Forrester, 2021). The project's tripartite model - combining real-time virtual hubs, asynchronous task sequences, and localized facilitation through libraries and rural institutions - presents a replicable format that expands access while maintaining educational rigor.

Furthermore, VEHUB4YOU operationalizes a thematic pivot from purely educational objectives to broader socio-economic goals aligned with the Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), and SDG 10 (Reduced Inequalities). By embedding sustainability-oriented tasks and entrepreneurial simulations into the VE structure, the project shifts the functional scope of virtual exchange from competence acquisition to systemic activation of business thinking.

Within the corpus of virtual exchange research, intercultural competence remains a central and empirically substantiated outcome. In alignment with Deardorff's (2006) intercultural competence process model - which emphasizes attitudes, knowledge, and skills as iterative components of intercultural development - VEHUB4YOU designed its learning environments to scaffold the progressive acquisition of these components.

Specifically, students participating in cross-border business simulations and sustainability challenges reported measurable gains in cultural self-awareness, tolerance of ambiguity, and adaptive communication strategies, as captured in post-task reflection protocols and evaluation rubrics.

These outcomes were not incidental but structurally embedded within the pedagogical architecture of the project. By applying the COIL (Collaborative Online International Learning) model in a transnational and multilingual context, VEHUB4YOU facilitated distributed group projects in which participants were required to solve context-sensitive entrepreneurial problems. According to O'Dowd (2018), COIL becomes most effective when students are given authentic tasks with real-world significance; this principle was operationalized through VEHUB4YOU's task typology, which included the co-design of mock start-ups, feasibility assessments for SDG-related micro-businesses, and comparative marketing strategies for local eco-products.

In addition, Kolb's (1984) experiential learning cycle - comprising concrete experience, reflective observation, abstract conceptualization, and active experimentation - provided a useful heuristic to map students' progression through virtual engagements. Pre-project surveys, midterm feedback, and final evaluation reports revealed that participants moved from initial curiosity and self-consciousness in intercultural interactions to the development of metacognitive strategies for conflict resolution and intercultural synergy.

Furthermore, by decentralizing the VE infrastructure and enabling participation from non-urban schools and rural libraries - particularly in Ukraine and Azerbaijan - the project transcended conventional barriers associated with internationalization at home. This approach resonates with Withanachchi and Sreesing's (2022) findings on inclusive virtual exchanges and their transformative potential for underserved youth.

In contrast to earlier generations of virtual exchanges, where intercultural engagement was an end in itself (often framed within the dialogue of cultures paradigm), VEHUB4YOU aligns with a third-generation model in which intercultural competence is a means toward enabling collaborative entrepreneurial agency (Ferreira-

Lopes & Van Rompay-Bartels, 2020). This represents a paradigmatic transition from cultural literacy to economic co-creation.

Chapter 1 introduces the conceptual and institutional background of the VEHUB4YOU initiative, interpreting it as a new model of digital and inclusive entrepreneurship education. The project is presented as a response to two interrelated challenges: the unequal access of young people to entrepreneurial learning opportunities and the need to redesign educational systems for cross-border, digitally mediated collaboration.

The chapter redefines the formation of economic behavior and business thinking as processes that emerge within international virtual ecosystems rather than traditional classroom settings. It formulates four guiding questions that focus on the construction of economic behavior, the theoretical models of entrepreneurial cognition, the required pedagogical redesign, and the mechanisms for transferring best practices across diverse educational systems.

The VEHUB4YOU model operates through a network of virtual business hubs established in different types of institutions - universities, schools, libraries, and NGOs - demonstrating how digital platforms can function as living laboratories for entrepreneurial learning.

The evolution of virtual exchange is described through three phases:

1. Cultural understanding, centered on dialogue and empathy;
2. Skill co-development, oriented toward project-based and collaborative learning;
3. Transformative economic agency, linking virtual exchange to entrepreneurship, employability, and community development.

VEHUB4YOU is identified as a representative of the third phase, connecting intercultural collaboration with real economic engagement. Its design emphasizes inclusiveness, distributed mentorship, and the creation of local innovation spaces that bridge urban–rural and institutional divides.

The chapter also outlines three mechanisms ensuring the project's sustainability and scalability:

– Organizational anchoring through integration of hubs into existing educational and community structures;

– Policy translation through collaboration with educational authorities and curriculum modernization;

– Digital interoperability that allows adaptation and replication of the model in new contexts.

Overall, Chapter 1 positions VEHUB4YOU as a systemic innovation in education, transforming virtual exchange from a communication tool into a structural component of digital entrepreneurship ecosystems. It demonstrates how such initiatives can generate long-term impact on youth employability, institutional resilience, and regional economic development.

CHAPTER 2
THEORETICAL FOUNDATIONS OF ECONOMIC BEHAVIOR AND ENTREPRENEURIAL THINKING

2.1. Human capital and economic behavior in education: state and individual perspectives

The concept of economic behavior in education encompasses the economic interpretation of decisions and choices made by individuals and society within the education sector, as well as the outcomes of those decisions. This concept is shaped by economic theories and the principles of behavioral economics, and it focuses on the decision-making processes of various stakeholders in the education system - including students, pupils, parents, teachers, educational institutions, and the state (Aliyeva, M. T.,2017).

At the core of economic behavior lies the scarcity of resources and the necessity of making choices. In the field of education, this manifests in the rational use of time, finances, labor, and other resources. For instance, a student's choice of academic specialization or a parent's decision to enroll their child in a public or private school is assessed in terms of expected future income, costs, and opportunity alternatives. Here, the cost-benefit balance is taken as the fundamental criterion (Organisation for Economic Co-operation and Development (OECD), 2022).

The scientific foundations of this concept are rooted in the following branches of economics:

- Classical and neoclassical economics: These perspectives assert that individuals make rational decisions aimed at maximizing utility. In the context of education, this approach explains a student’s choice to pursue higher education as a means to achieve higher income and improved social status.

- Behavioral economics: This field demonstrates that individuals do not always act rationally, and that psychological and emotional factors also influence decision-making. For example, parents taking on debt to enroll their children in prestigious

schools can be interpreted more as a result of social influences than purely rational economic behavior.

- Education as an investment: Education is viewed as a form of long-term investment at both individual and societal levels. The core question here is: What future economic benefits will offset the costs incurred for education today?

- Human capital theory: According to this theory, education enhances an individual's knowledge and skills, thereby increasing their value in the labor market. This, in turn, contributes to increased productivity and national income from an economic standpoint.

The concept of economic behavior in education is of great significance not only from an individual perspective but also in terms of public policy. Government budget allocations for education, subsidies directed at the sector, scholarships, student loans, and incentive programs all influence the formation of economic behaviors. For instance, government-provided student loans enable more young people to pursue higher education, which in turn leads to an overall increase in human capital (Aliyev I. H., 2018).

The conceptual foundations of economic behavior in education are crucial for understanding the economic motivations and rationale underlying decisions in this field. This approach provides an important analytical framework for enhancing the quality of education, increasing the effectiveness of educational reforms, and ensuring social equity.

The role of economic incentives in the education sector has a direct impact on the behavior and decision-making mechanisms of stakeholders involved in this field. Economic incentives refer to material and non-material factors that motivate individuals and institutions to engage in specific actions. In education, these incentives can manifest in various forms - scholarships, reward systems, tax exemptions, subsidy programs, student loans, labor market incentives, and, more broadly, socio-economic advantages (Rzayev R. R., 2020).

For learners, incentives not only enhance interest in education but also play a significant role in educational continuity and career or specialization choices. For instance, the availability of scholarships directly influences students' decisions to pursue higher education, as they help cover educational costs and encourage academic achievement. At the same time, state support and concessions directed toward education expand access for students from low-income families, thereby contributing to social equity (Organisation for Economic Co-operation and Development (OECD), 2022).

For teachers, economic incentives are primarily offered in the form of salary increases, reward systems, and opportunities for professional development. Such incentives not only enhance teachers' motivation and improve the quality of instruction but also increase the overall attractiveness of the profession. Especially in developing countries, raising teachers' wages and improving working conditions contribute significantly to the overall performance of the education system.

Economic incentives also play a role in fostering efficiency and innovation-driven approaches in the management of educational institutions. For instance, higher education institutions utilize government contracts and grant programs to attract more students, invest in scientific research, and aim for higher positions in international rankings. This, in turn, strengthens competition and leads to improvements in the quality of education (Rzayev R. R., 2020).

In addition, the outcomes of economic incentives in education manifest at various levels. At the individual level, increased access to education results in the development of a better-prepared human capital entering the labor market in the future. At the societal level, these outcomes include economic growth, increased productivity, enhanced social mobility, and a reduction in poverty. However, improperly implemented or inefficient economic incentives may also lead to adverse consequences. For instance, the mass expansion of education can result in declining quality and inefficient use of financial resources (Alakbarov S. B., 2021)

The impact of economic incentives on the education sector is multifaceted and requires a strategic approach. The proper design and implementation of these

incentives should support not only individual interests but also the development of education policies that serve the broader progress of society.

Behavioral economics plays a crucial role in the formation of education policy and in providing a more realistic and human-centered understanding of decision-making processes in education. While traditional economic models are based on the assumption of rational decision-making, behavioral economics emphasizes that psychological, emotional, and social factors also influence these decisions. This perspective is essential for understanding how individuals make educational choices, which incentives they respond to, and why they sometimes behave irrationally.

For education policymakers, behavioral economics offers powerful tools for developing effective strategies and interventions. One of the most widely applied concepts in this framework is the theory of nudge. According to this theory, individuals are influenced by the environment and the way choices are presented to them. In education, this might involve providing parents with more transparent and accessible information about school options, automatically offering students information about available scholarships, or implementing reward systems that encourage students to engage in reading. Such soft interventions guide behavior without restricting individual autonomy (Aliyeva M. T., 2017).

On the other hand, behavioral economics allows for a deeper analysis of the equity-efficiency dilemma in education. The dominance of factors such as social status, perceived fairness, social influence, and future expectations in family education decisions urges governments to rethink policies aimed at social justice. For instance, children from low-income families may drop out of school at an early age because they do not fully grasp the long-term benefits of education. Addressing this problem requires more than just financial support; additional measures such as awareness campaigns, motivational strategies, and social incentive mechanisms must also be implemented.

The application of behavioral economics in education policy is also important for improving teacher motivation and performance. In addition to salaries, the strengthening of non-financial incentives - such as recognition, opportunities for

professional development, social status, and the internal school environment - contributes to greater effectiveness in teachers' work. This, in turn, has a positive impact on the overall quality of education (Institute of Education, 2018).

In general, behavioral economics calls for education policy to take into account not only structural and financial aspects, but also the foundations of human behavior. As a result, education policies can be designed to be more targeted, equitable, and efficient, ensuring that all segments of society can benefit equally from educational opportunities. This approach enables the education systems of the future to become more adaptive, inclusive, and innovative.

In Azerbaijan, the development and manifestation of economic behavior in education are closely tied to several social, cultural, and economic factors. Recent educational reforms, government programs aimed at the development of human capital, and structural changes in the labor market have significantly influenced the economic decisions and behaviors of stakeholders in the education sector. However, these behaviors are rooted not only in economic rationality but also in social expectations, family values, and psychological factors. The state programs implemented have had a direct impact on shaping students who meet the needs of the modern era, and thus on the formation of a modern society. Since gaining independence in 1991, Azerbaijan has attached great importance to the field of education. In the following table, we can observe, in periodic sequence, the state budget expenditures on education by year.

Table 2.1. Government Expenditure on Education from the State Budget (Million Manat)

1995	2000	2005	2010	2015	2021	2022	2023
75.2	181.8	372.5	1,180.8	1,605.1	3,092.2	3,696.5	4,124.8

In modern Azerbaijani society, parents' approach to education is closely related to their children's future socio-economic status. For this reason, many families, despite the high financial costs, send their children to private tutors, prefer private schools, or opt for education abroad. These behaviors indicate that education is viewed as an

investment. However, differences in behavior models are observed across regions. While in urban areas there is a greater investment in education and a tendency towards competition, in rural areas, the perception of the economic importance of education may be weaker. This is due to both informational inequality and income disparities.

Changes are also observed in students' economic behavior. What was once a focus solely on obtaining a diploma is now gradually being replaced by choosing a specialty that is competitive in the labor market. Economic incentives, such as government scholarships, job placement opportunities in specific fields, and education loans, significantly influence the formation of these decisions. At the same time, waves of demand in the labor market for certain fields have guided students' choices. In this context, the level of information provision plays a crucial role - the ability of students to analyze future earning potential determines their education duration, tendencies to attend additional courses, and the type of education they pursue (Quliyev E. H., 2019)

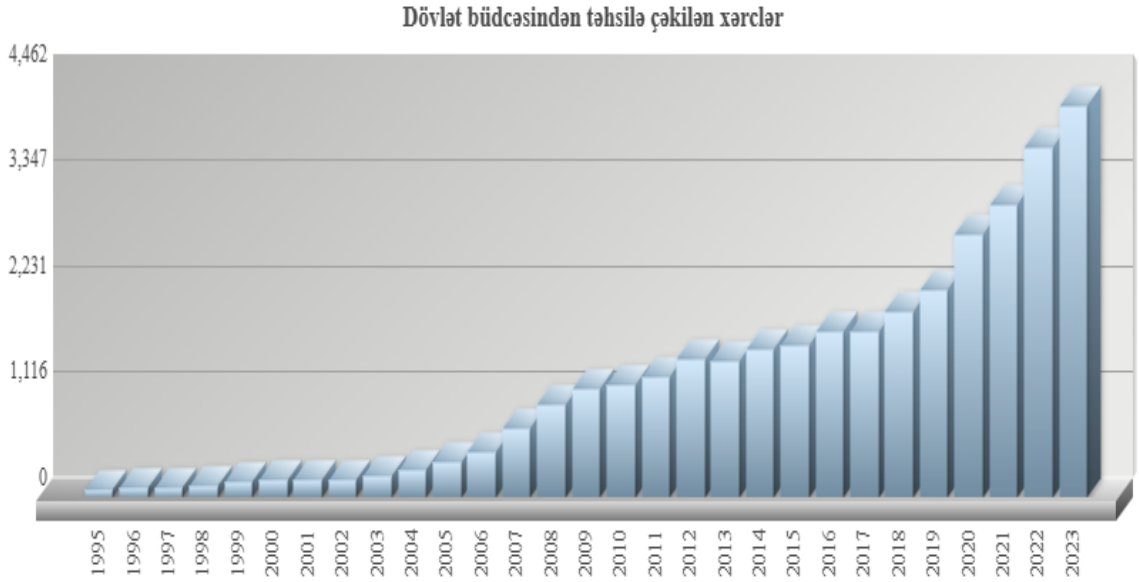

Fig. 2.1. Government Expenditure on Education from the State Budget (Million Manat)

As shown in Image 1, Azerbaijan has been making significant financial expenditures from the state budget on education over the years.

Teachers' economic behaviors are more closely related to working conditions, material incentives, and social status. Although salary increases, professional

development programs, and diagnostic assessments aimed at enhancing the attractiveness of the teaching profession have yielded some results, the creation of equal opportunities and the maintenance of balance in resource distribution across regions remain important issues.

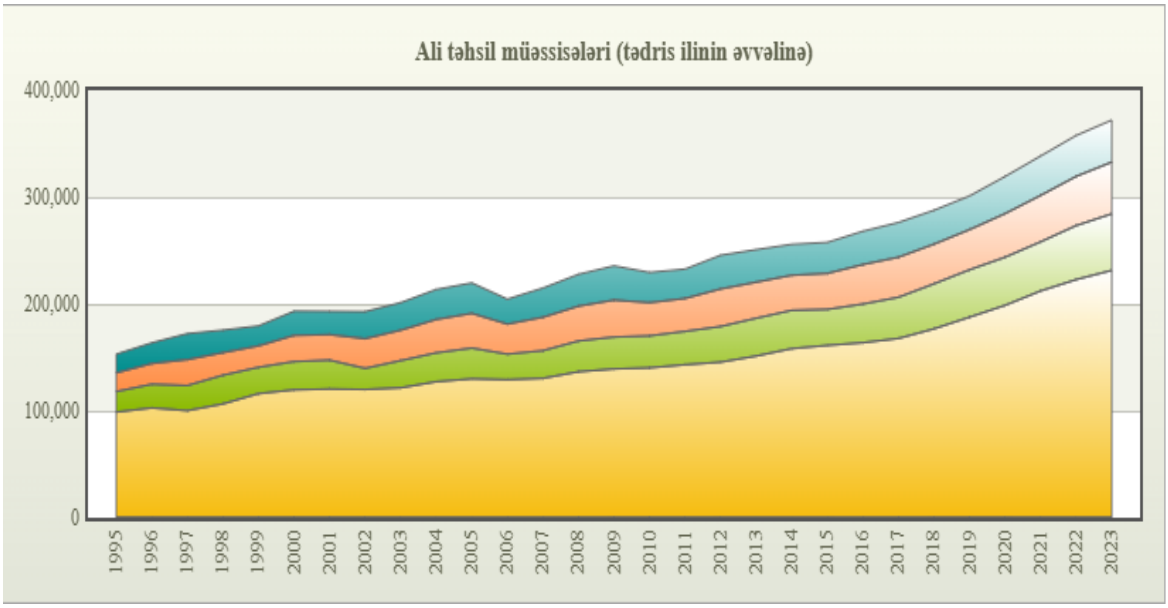

Fig. 2.2. Higher Education Institutions at the Start of the Academic Year

The Azerbaijani government's education policy has already incorporated elements of behavior-oriented economic approaches. For example, the adjustment of quotas for university programs in line with labor market demand, the implementation of scholarship and loan programs targeting different social strata, and differentiated salary models for teachers based on their professional levels are indicators of positive progress in this area.

In terms of future perspectives, there is a need to develop deeper and more targeted education policies based on the principles of behavioral economics. This approach could allow for more effective and inclusive decision-making by considering the real behavior mechanisms of education participants. For instance, increasing the level of information available to parents, familiarizing students with income forecasts for their chosen fields of study, and expanding teachers' access to psychological and

social support in their work environment are some of the steps that could be taken in this direction.

Table 2.2. Key Indicators of Higher Education in Azerbaijan (1995–2023)

Indicator	1995	2000	2005	2010	2015	2020	2021	2022	2023
Number of higher education institutions (units)	46	47	47	51	54	52	51	51	51
Number of students in higher education institutions (persons)	98,812	119,683	129,948	140,241	161,234	198,707	212,173	222,809	231,437
Number of students admitted to higher education institutions (persons)	19,238	26,403	28,747	29,904	33,645	45,003	45,986	50,522	52,880
Number of graduates from higher education institutions (persons)	17,436	24,488	32,508	31,071	33,705	40,824	43,409	46,039	48,421
Number of academic staff in higher education institutions (permanent staff) (persons)	11,012	12,484	14,352	14,919	14,550	15,235	14,939	15,101	15,807

As a result of the right steps taken and programs implemented, there has been an increase in the number of students in higher education institutions in Azerbaijan over the years. For example, in 1995, the number of students was 98,812, while in 2023, it had risen to 231,437.

The current situation of economic behavior in education in Azerbaijan is dynamic and multifaceted. By continuously analyzing this field and integrating the theoretical

foundations of behavioral economics with the government's strategic approaches, it is possible to form a fairer, more efficient, and sustainable education system.

Considering that the current state of economic behavior in education is dynamic and multifaceted, students directed towards new and prospective fields represent potential human capital that will impact the national economy. A workforce with innovative thinking participating in production will enhance efficiency, thereby increasing competitiveness. The efficient utilization of production potential will aid in entering foreign markets, transforming the country from an importer to an exporter. A positive trade balance between imports and exports will ensure the inflow of foreign currency, improving the country's prosperity. Teaching economic behavior to university students and young teachers will contribute to the formation of a new generation with skilled professionals and a solid knowledge base, impacting future generations and the development of specialized workforce.

2.2. Entrepreneurial thinking in globalized world

The twenty-first century brings about swift technological development alongside economic unity and social reshaping which impact both entrepreneurial activities and educational systems. Globalization has removed previous trade restrictions and communication obstacles and knowledge exchange boundaries to form a system where opportunities and obstacles exist across international borders (Acs et al., 2018). The uncertain business environment requires entrepreneurial thinking which enables people to detect business possibilities and develop innovative solutions and adjust to changing circumstances (Neck & Greene, 2011). Entrepreneurial thinking surpasses business startup activities because it represents a mindset dedicated to creating value while recognizing opportunities and solving problems proactively (Fayolle & Gailly, 2015). The global economy's increasing digitalization and interconnection requires the essential skills of entrepreneurial thinking including creativity and critical thinking and adaptability and intercultural competence for all economic sectors. Educational institutions need to develop the required competencies in youth populations because

this preparation will enable them to both secure employment and take part in economic development (Bacigalupo et al., 2016).

The VEHUB4YOU project which unites Italian and Ukrainian and Azerbaijani and Latvian partners demonstrates the rising significance of international collaboration and virtual exchanges in entrepreneurial education. These initiatives allow young people to develop entrepreneurial skills through digital platforms and international networks which helps them grow individually while advancing collective innovation5.

This chapter examines entrepreneurial thinking in globalized environments through theoretical studies of its fundamental concepts and essential capabilities and suitable educational strategies and virtual exchange capabilities. The Italian perspective guides the analysis throughout the paper through the examination of national initiatives and VEHUB4YOU project contributions.

Academic and policy circles together with 21st century economic growth and innovation and adaptability recognize entrepreneurial thinking as a complex system which has gained substantial attention (Neck & Greene, 2011). Entrepreneurial thinking stands apart from traditional business management because it bases operations on opportunity identification while maintaining proactive actions through ambiguous risk management (Shane & Venkataraman, 2000). The concept of entrepreneurial thinking consists of cognitive and behavioral processes, which include opportunity recognition, creative problem-solving, and strategic resource mobilization to create value in unpredictable environments (Fayolle & Gailly, 2015).

The research domain of entrepreneurial thinking has developed through multiple influential theoretical frameworks. Effectuation theory shows that effective entrepreneurs use their available resources to build opportunities alongside stakeholders through flexible strategies that change based on emerging information (Sarasvathy, 2001). The core concept of opportunity-based entrepreneurship focuses on discovering and leveraging opportunities that other people fail to notice (Shane & Venkataraman, 2000). The resource-based view emphasizes that organizations need distinctive resource arrangements alongside flexible capabilities to maintain market leadership (Barney, 1991).

The field of study now places greater emphasis on the entrepreneurial mindset, which comprises psychological attributes including resilience, self-efficacy, proactiveness, and growth orientation (Dweck, 2008). Researchers now identify these attributes as fundamental elements for managing the volatility, uncertainty, complexity, and ambiguity (VUCA) that defines the worldwide economy. The European Commission's EntreComp Framework integrates this knowledge by defining entrepreneurial competence as the transformation of concepts into business activities that produce value for others, while identifying three core domains: Ideas and Opportunities, Resources, and Into Action (Bacigalupo et al., 2016).

Entrepreneurial competence is the ability to turn ideas into action that generate value for someone other than oneself. It is founded on creativity, critical thinking, and the capacity to mobilize resources in a responsible manner (Bacigalupo et al., 2016).

The EntreComp Framework's multiple-dimensional structure serves as a widely used framework for both educational and policy initiatives to create curricula and assessments throughout Europe and additional regions.

A defining feature of entrepreneurial thinking is its orientation toward innovation, disruption, and the pursuit of new opportunities, as opposed to the efficiency and optimization focus typical of traditional business management (Ireland et al., 2003). Entrepreneurial thinkers are characterized by their willingness to challenge the status quo, experiment with novel solutions, and learn from failure - traits that are especially critical in global markets marked by volatility and complexity (Kuratko, 2016). In contrast, traditional business thinking often emphasizes stability, process optimization, and risk minimization, which, while valuable in established markets, may limit adaptability and responsiveness in rapidly changing environments.

This distinction is not merely academic; it has profound implications for how organizations structure their operations, develop talent, and respond to external shocks. Companies that foster entrepreneurial thinking are more likely to invest in research and development, pursue internationalization, and engage in strategic alliances that open new markets (Covin & Slevin, 1989). At the individual level, entrepreneurial thinkers demonstrate greater self-efficacy, resilience, and a propensity for lifelong learning -

qualities that are increasingly essential in the context of globalization and digital transformation (Rae, 2017).

Table 2.3 highlights the primary differences between entrepreneurial thinking and traditional business thinking across five core dimensions: orientation, attitude to risk, approach to innovation, time horizon, and mindset. Entrepreneurial thinking is characterized by proactivity, opportunity-seeking, and adaptability, while traditional business thinking emphasizes efficiency, risk minimization, and stability.

Table 2.3. Key Distinctions Between Entrepreneurial Thinking and Traditional Business Thinking. Authors' elaboration.

Dimension	Entrepreneurial Thinking	Traditional Business Thinking
Orientation	Opportunity-driven, proactive, innovative	Efficiency-driven, reactive, conservative
Attitude to Risk	Embraces uncertainty and risk	Seeks to minimize risk
Approach to Innovation	Seeks disruption, new markets, creative solutions	Focuses on incremental improvement
Time Horizon	Long-term value creation, scalability	Short- to medium-term profit maximization
Mindset	Growth, experimentation, learning from failure	Stability, optimization, established models

The shift from a traditional to an entrepreneurial mindset is increasingly seen as a prerequisite for success in the digital and global economy, prompting educational systems and organizations to rethink how they cultivate talent and foster innovation.

The way people think and act like entrepreneurs has changed a lot because of globalization. Entrepreneurs now have both new opportunities and new problems because markets are more connected, technology spreads quickly, and talented people can move around (Acs et al., 2018). In a globalized economy, being an entrepreneur means being able to spot and take advantage of opportunities across borders, as well as being able to deal with cultural differences, complicated rules, and more competition.

Intercultural competence, or the ability to understand and adapt to different cultural norms, values, and ways of communicating, is an important part of entrepreneurial thinking in this situation (Deardorff, 2006). Digital literacy has also become a basic skill that lets entrepreneurs use digital platforms for market research,

gathering resources, and working together across borders (World Economic Forum, 2020). The growth of global value chains and remote work has made networked collaboration and virtual teamwork even more important. This shows how much we need entrepreneurial thinkers who are both globally minded and good with technology.

In a world that is becoming more global, entrepreneurs need to be able to build and maintain international partnerships, deal with different rules and regulations, and quickly adapt to new technologies. This calls for a special mix of cognitive, social, and digital skills, as well as a desire to learn new things and grow on your own.

More and more people are seeing metacognition, or thinking about thinking, as a key part of entrepreneurial thinking and a big reason why some entrepreneurs do better than others in complex, uncertain situations (Haynie et al., 2010). In the business world, metacognition is the ability to keep an eye on, judge, and control one's own thinking while looking for, assessing, and taking advantage of opportunities. This self-awareness lets business owners change their plans, question their assumptions, and learn from both their successes and failures. This is especially important in global markets, which are always changing and hard to predict.

Recent research has organized entrepreneurial metacognition into a number of related mental activities, such as becoming more aware of oneself, keeping an eye on and controlling one's own thinking, and intentionally practicing reflective thinking to become a better entrepreneur. Metacognitive entrepreneurs are more likely to make decisions that are flexible and use feedback from the environment to change their heuristics and strategies on the fly. This ability to adapt is especially important for recognizing opportunities and gathering resources because it lets entrepreneurs stay flexible and respond quickly to changes in the market and technology (Haynie et al., 2010).

Empirical studies have identified five core dimensions of entrepreneurial metacognition:

- Metacognitive Knowledge (awareness of one’s own cognitive strengths and limitations),

- Metacognitive Experience (reflecting on past decisions and outcomes),
- Metacognitive Monitoring (tracking ongoing cognitive processes),
- Metacognitive Control (adjusting strategies based on feedback),
- Goal Orientation (aligning cognitive processes with entrepreneurial objectives).

These dimensions work together to improve cognitive flexibility, which lets entrepreneurs switch between different ways of thinking, like analytical, intuitive, and creative, depending on what the situation calls for (Haynie & Shepherd, 2009). This kind of flexibility is not something that comes naturally, but it can be learned through focused training and reflective practice. This makes it a good area to focus on in entrepreneurship education.

The entrepreneurial mindset and metacognition are both important parts of lifelong learning. Entrepreneurs need to keep learning new things, improving their skills, and expanding their networks if they want to stay competitive in the fast-changing world of business. Setting clear, measurable learning goals, regularly checking one's skills, and looking for a variety of learning resources, like online courses, professional workshops, and peer networks, are all parts of lifelong learning. This ongoing process of self-directed learning not only makes people more adaptable and creative, but it also helps them stay strong when things go wrong or change (Cope, 2011).

So, an entrepreneurial mindset means being open to feedback, being dedicated to making things better all the time, and taking the initiative to grow both personally and professionally. Entrepreneurs who are open to learning new things will be better able to spot new opportunities, change course when things go wrong, and create businesses that are both innovative and strong (Rae, 2017). Also, adding metacognitive training to entrepreneurship classes has been shown to improve students' ability to think about things, make decisions, and be more effective as entrepreneurs overall.

Metacognition and lifelong learning are even more important now that the world is becoming more connected and technology is changing. Entrepreneurs have to deal with complicated intercultural situations, use digital tools, and work together across virtual networks. These tasks require a lot of self-control, flexibility, and reflective learning. Because of this, modern entrepreneurial education and policy should focus on developing metacognitive skills and a desire to learn for the rest of one's life.

The rise of the global digital economy has changed what it means to be a successful entrepreneur. Entrepreneurial skills now go beyond just technical or managerial skills. They now include cognitive, social, digital, and ethical skills, which show how complicated and connected 21st-century markets are. Recent research and policy frameworks, such as the European Commission's EntreComp, emphasize the importance of a comprehensive, lifelong approach to entrepreneurial competence that can be applied in all types of learning settings, including formal, non-formal, and informal ones (Bacigalupo et al., 2016).

Entrepreneurs need to be able to think critically and solve problems in order to be successful. Entrepreneurs need to be able to think through unclear situations, combine different pieces of information, and make choices when they don't know what's going to happen (Fayolle & Gailly, 2015; Jardim, 2021). Recognizing and evaluating opportunities, also known as opportunity recognition, is a key entrepreneurial skill that involves scanning the environment, coming up with creative ideas, and being able to picture new ways to meet new needs (Shane & Venkataraman, 2000).

Creativity is at the heart of entrepreneurship because it lets people come up with new ideas and ways of doing things. Creativity isn't just about coming up with new products; it's also about finding new ways to use existing resources and processes to make new value (Bacigalupo et al., 2016). The EntreComp framework lists creativity, vision, and valuing ideas as important parts of the Ideas and Opportunities domain. This shows how important they are for both business and social entrepreneurship.

In a world that is becoming more connected, it is important to be able to communicate and understand people from other cultures. Entrepreneurs work in multicultural teams and international markets, so they need to be able to communicate,

negotiate, and handle conflicts across cultures (Deardorff, 2006). Networking competence is also important for getting to know people, finding resources, and getting into markets (Acs et al., 2018; Jardim, 2021).

Leadership and emotional intelligence help people build and lead high-performing teams. Teamwork and collaborative skills help people work together to solve problems and come up with new ideas (Boyd & Vozikis, 1994; Jardim, 2021). Mobilizing others, taking the initiative, and working with others are all core competencies in the EntreComp framework.

Being able to use computers and the internet is now a basic skill needed for starting a business. Entrepreneurs need to know how to use digital tools for market research, product development, marketing, and working together from a distance (World Economic Forum, 2020; Secundo et al., 2021). The COVID-19 pandemic sped up the use of digital platforms, making skills like e-commerce, online communication, and digital marketing even more important (Jardim, 2021).

Also, being able to learn and use new technologies like artificial intelligence, blockchain, and data analytics is becoming more and more important for staying competitive and keeping up with fast-changing markets (Ratten & Jones, 2021). The Resources section of the EntreComp framework includes mobilizing resources, financial and economic literacy, and mobilizing others. All of these things are becoming more digital.

Self-efficacy, adaptability, and resilience are personal traits that have been shown to be good indicators of how well someone will do as an entrepreneur (Dweck, 2008; Haynie et al., 2010; Jardim, 2021). The path of an entrepreneur is often full of uncertainty, setbacks, and failure. This is why it is so important to be able to keep going, learn from mistakes, and stay motivated (Cope, 2011).

Self-regulation, or the ability to set goals, keep track of progress, and change behavior based on feedback, is closely related to metacognitive skills and helps people manage their time, resources, and stress (Haynie & Shepherd, 2009). Motivation and perseverance, self-awareness and self-efficacy, and learning through experience are some of the most important skills in the EntreComp framework.

Entrepreneurial thinking is based on being proactive, having a sense of moral duty, and being willing to take calculated risks (Kuratko, 2016; Bacigalupo et al., 2016). These attitudes affect how business owners deal with problems and opportunities, as well as how investors, partners, and the general public see them.

In a globalized world, businesses must also be committed to sustainable and inclusive entrepreneurship, which means being aware of how their actions affect people and the environment (Ratten & Usmanij, 2021). This is shown by the increasing focus on social entrepreneurship, corporate social responsibility, and the United Nations Sustainable Development Goals in business education.

Table 2.4. Key Competencies for Entrepreneurial Thinking in a Globalized World. Authors' elaboration.

Competency Domain	Key Competencies	Example Frameworks/References
Cognitive & Analytical	Critical thinking, problem-solving, opportunity recognition, creativity, vision	EntreComp, Jardim (2021), Fayolle & Gailly
Social & Interpersonal	Intercultural competence, communication, networking, leadership, teamwork, emotional intelligence	EntreComp, Deardorff (2006), Jardim (2021)
Digital & Technological	Digital literacy, online collaboration, technological adaptability, e-commerce skills	EntreComp, World Economic Forum (2020), Secundo et al. (2021)
Personal & Self-Regulatory	Resilience, adaptability, self-efficacy, self-regulation, motivation, learning from experience	EntreComp, Dweck (2008), Haynie et al. (2010)
Attitudes & Values	Proactiveness, ethical responsibility, risk-taking, sustainability, inclusiveness	EntreComp, Kuratko (2016), Ratten & Usmanij (2021)

Table 2.4 lists the skills needed to be a successful entrepreneur in a globalized world in a structured way. Figure 2.3 shows the official EntreComp Wheel, which visually groups the 15 most important entrepreneurial skills into three main areas. This is to show how these skills are connected and how they work together as a whole. This visual framework is used a lot in Europe as a guide for making policies, assessments, and curricula in entrepreneurial education (Bacigal Lease et al., 2016).

Fig. 2.3. The EntreComp Framework. Authors' elaboration

In brief, the literature and policy frameworks agree on a multidimensional model of entrepreneurial competence that is dynamic, lasts a lifetime, and can be used in many different situations. These skills are not only important for people who start businesses, but they are also becoming more and more important for everyone who has to deal with the unknowns of the global digital economy. The problem for teachers and policymakers is coming up with ways to teach and test these skills in formal, non-formal, and informal settings.

The way that entrepreneurship is taught has changed quickly to keep up with the needs of a globalized, digital, and innovation-driven economy. Modern entrepreneurship education is no longer just about teaching students about business; it's also about helping them develop entrepreneurial mindsets, skills, and behaviors through active, learner-centered, and technology-enhanced methods (Gangi & Sirelkatim, 2023; Myue, 2024; Jardim, 2021). A growing body of research supports this change by showing what works in teaching, how important it is to put things in context, and how important it is to keep changing the curriculum.

Numerous individuals agree that experiential learning is a key part of teaching entrepreneurship. This teaching style is based on Kolb's theory of experiential learning,

which says that people learn best by doing things, thinking about them, coming up with ideas, and trying things out (Kolb, 1984; Lackéus, 2015). Students work on projects, simulations, and internships that are similar to what they would do in the real world. These activities help them learn how to spot opportunities, take risks, and be resilient (Fiet, 2001; Lackéus, 2015). Experiential approaches have been shown by research to boost entrepreneurial intentions, boost self-efficacy, and make it easier to deal with uncertainty and failure (Gangi & Sirelkatim, 2023; Rasmussen & Sørheim, 2006; Taylor, 2016). The Babson College model, where students start businesses while they are still in school, is an example of how learning by doing can help people become better entrepreneurs (Fiet, 2001; Gangi & Sirelkatim, 2023).

Project-Based Learning (PBL) and Problem-Based Learning (PrBL) put students in real-life situations that are similar to those faced by entrepreneurs (Jardim, 2021; Myue, 2024). Students work together to create business plans, prototypes, or market strategies, manage resources, and adjust to changing project needs (Musteen et al., 2018; Mason & Arshed, 2013). These methods encourage self-directed learning, interdisciplinary collaboration, and critical thinking, teamwork, and leadership (Welsha et al., 2016; Krueger, 2007). Research shows that PBL and PrBL make students more confident, creative, and able to use what they learn in real life (Jardim, 2021; Lackéus, 2015).

Design thinking is a way of solving problems that puts people first and encourages creativity, empathy, and experimentation (Brown, 2008; Myue, 2024). Design thinking is a part of entrepreneurship classes. It helps students figure out what users need, come up with ideas, make prototypes, and test them, just like an entrepreneur would (Stanford d.school; Myue, 2024). According to research, design thinking improves the ability to spot opportunities, come up with new ideas, and deal with uncertainty (Jardim, 2021; Rodrigues, 2023). The method works best in multicultural and interdisciplinary learning settings, where different points of view lead to creative solutions (Brown, 2008; Myue, 2024).

To be successful as an entrepreneur, you need to have good interpersonal and networking skills. Team projects, peer assessment, and service learning are all

examples of collaborative learning strategies that can help you build these skills (Boyd & Vozikis, 1994; Harms, 2015; Warhuus et al., 2017). Students learn how to lead, negotiate, and communicate better when they work in groups with people from different backgrounds. They also learn from each other and solve problems together (Rogers & Lea, 2005; Parrish et al., 2021). Active learning techniques like case studies, role-playing, and simulations also help people become more involved, think critically, and develop their metacognitive skills (Rasmussen & Sørheim, 2006; Fiet, 2001; Gangi & Sirelkatim, 2023). Case study analysis is a great way to connect theory and practice because it gives real-life examples that help people develop their entrepreneurial mindset and skills (Fiet, 2001).

Digital tools and online exchanges are changing how entrepreneurship is taught, making it easier to learn, more interactive, and connected to the rest of the world (World Economic Forum, 2020; Myue, 2024). Online platforms, business simulations, and digital collaboration tools help students learn by doing and working together, so they can do entrepreneurial activities from anywhere (Bandera et al., 2018; Bell & Kozlowski, 2002; Carlson et al., 2013). Working on projects and learning with people from different cultures online can help you become more culturally aware, digitally literate, and open to new business ideas from around the world (Harms, 2015; Rogers & Lea, 2005; Parrish et al., 2021). The VEHUB4YOU project and others like it show that virtual exchanges improve communication, problem-solving, and recognizing opportunities in cross-border business education.

Nowadays, mentorship and coaching are seen as the best ways to teach entrepreneurship. They give students advice, feedback, and access to professional networks (Gangi & Sirelkatim, 2023; Arthur-Holmes et al., 2022). Working with people outside of school, like entrepreneurs, investors, and community groups, gives students a taste of real-world problems and different points of view, which makes educational programs more useful and effective (Gangi & Sirelkatim, 2023; Welsha et al., 2016). According to Gangi and Sirelkatim (2023) and Myue (2024), some other important success factors are integrating entrepreneurship into all subjects and building partnerships with businesses and local ecosystems.

To measure entrepreneurial skills and mindsets, you need strong assessment methods. Recent studies suggest that a mix of formative and summative assessments, such as self-reflection, peer feedback, portfolio evaluation, and performance-based tasks, should be used (Gangi & Sirelkatim, 2023; Rodrigues, 2023). Entrepreneurship education stays relevant and effective by constantly changing the curriculum based on trends in the business world and feedback from students (Jardim, 2021; Myue, 2024).

Even though the benefits have been shown, there are still problems with putting new teaching methods into practice. These include making sure that teachers are well-trained and knowledgeable about how to teach, adapting curricula for different types of students, making sure that all students can access digital resources, and creating learning environments that welcome everyone (Jardim, 2021; Myue, 2024; Gangi & Sirelkatim, 2023). The literature also says that more research needs to be done on the long-term effects of different teaching styles and the use of new technologies like AI and gamification (MDPI, 2024; World Economic Forum, 2020).

To sum up, good entrepreneurship education includes a mix of experiential, project-based, design thinking, collaborative, and technology-enhanced teaching methods, as well as mentoring and strong assessment. These methods, which are based on a lot of real-world research, are necessary for building the entrepreneurial mindsets and skills needed in a digital, globalized world. To get future generations of entrepreneurs ready, teaching methods need to keep changing based on ongoing research and input from stakeholders.

Virtual exchanges are a game-changing new idea in entrepreneurship education, especially now that the world is becoming more global and digital. These exchanges use digital platforms to enable real, cross-border collaboration and experiential learning, which makes entrepreneurial education more inclusive and scalable (Bandera et al., 2018; Gangi & Sirelkatim, 2023; Jardim, 2021). This teaching style has become more popular in recent years, especially as colleges and universities and international projects like VEHUB4YOU try to get students ready for the challenges of a Volatile, Uncertain, Complex, and Ambiguous (VUCA) world (World Economic Forum, 2020; Zhu et al., 2022).

Virtual exchanges are structured, technology-mediated interactions between learners from different cultural or national backgrounds, designed to foster intercultural competence, collaborative problem-solving, and entrepreneurial skills (Erasmus+ Virtual Exchanges, 2025; Soliya, 2025; Bandera et al., 2018). Virtual exchanges, on the other hand, eliminate problems associated with cost, location, and time. This makes international and entrepreneurial learning available to a wider range of students (Stevens Initiative, 2025; Carlson et al., 2013).

From a teaching point of view, virtual exchanges are based on theories of experiential and project-based learning that stress active participation, reflection, and the building of knowledge together (Kolb, 1984; Lackéus, 2015). Studies show that these methods improve higher-order thinking, creativity, and understanding of concepts, which are all important parts of entrepreneurial thinking (Fiet, 2001; Musteen et al., 2018; Jardim, 2021).

A robust body of literature confirms that virtual exchanges foster a wide range of entrepreneurial competencies:

- Intercultural competence: Engaging with peers from diverse backgrounds develops empathy, adaptability, and the ability to navigate ambiguity - traits essential for global entrepreneurship (Deardorff, 2006; Bandera et al., 2018; Gangi & Sirelkatim, 2023).

- Critical thinking and creativity: Exposure to different perspectives challenges students to question assumptions, synthesize new ideas, and co-create innovative solutions (Fiet, 2001; Jardim, 2021; Zhu et al., 2022).

- Digital literacy and remote collaboration: Virtual exchanges require proficiency in digital tools, project management, and online communication, mirroring the realities of modern entrepreneurial practice (Secundo et al., 2021; World Economic Forum, 2020; Carlson et al., 2013).

- Teamwork and leadership: Working in virtual, multicultural teams strengthens social and leadership skills, which are critical for entrepreneurial ventures (Boyd & Vozikis, 1994; Warhuus et al., 2017; Zhu et al., 2022).

- Resilience and adaptability: Navigating the challenges of virtual collaboration - such as time zones, language barriers, and technological glitches - builds persistence and flexibility (Cope, 2011; Musteen et al., 2018).

Recent studies, including meta-analyses of STEM and entrepreneurship education, show that virtual project-based learning greatly improves higher-order thinking, scientific practices, and both cognitive and non-cognitive skills, especially when entrepreneurial elements are included (Musteen et al., 2018).

Virtual exchanges are especially good at developing the entrepreneurial mindset, which is a set of attitudes, habits, and ways of thinking that help people see opportunities, create value, and come up with new ideas (Neck & Greene, 2011; Daspit et al., 2023). The literature says that curiosity, connections (networking), and creating value are the three most important parts of the entrepreneurial mindset in virtual and interdisciplinary settings (IEEE, 2024). These exchanges help students learn how to take charge, deal with uncertainty, and feel like they have control over their lives, which are all important skills for starting a business (Gangi & Sirelkatim, 2023; Kuratko, 2016).

Also, virtual exchanges help students develop metacognitive and self-regulatory skills because they have to think about what they've learned, adjust to feedback, and keep track of their own progress in a digital setting (Haynie et al., 2010; Harms, 2015; Zhu et al., 2022).

The VEHUB4YOU project exemplifies the integration of virtual exchanges into entrepreneurial education. By creating a network of international virtual business hubs, VEHUB4YOU has enabled thousands of young people in Italy, Ukraine, Azerbaijan, and Latvia to participate in business simulations, collaborative projects, and intercultural dialogue. Key features of the project include:

- Business simulation and practical training: Participants engage in realistic entrepreneurial scenarios, developing decision-making, risk assessment, and strategic planning skills (KNUTD, 2025; Musteen et al., 2018).

- Intercultural and interdisciplinary teamwork: Students work in diverse teams, enhancing their ability to collaborate, communicate, and innovate across cultural and disciplinary boundaries (Bandera et al., 2018).

- Mentorship and external stakeholder engagement: The project incorporates mentorship from experienced entrepreneurs and collaboration with industry partners, aligning with best practices identified in the literature (Gangi & Sirelkatim, 2023; Arthur-Holmes et al., 2022).

- Portfolio development and assessment: Participants create digital portfolios documenting their entrepreneurial achievements, supporting reflection and long-term professional growth (Rodrigues, 2023).

Structured facilitation, real project-based learning, integrating the curriculum, and getting feedback all the time are some of the best practices for virtual exchanges around the world (Bandera et al., 2018; Myue, 2024; Warhuus et al., 2017). The literature also talks about how important it is to be inclusive and make sure that all students, no matter where they come from, can take advantage of these opportunities (Jardim, 2021).

Virtual exchanges have a lot of potential, but they also have a lot of problems:

- Digital divide and access: Unequal access to technology and reliable internet can limit participation, particularly in rural or low-income contexts (Secundo et al., 2021; World Economic Forum, 2020).

- Sustaining engagement: Maintaining motivation and active participation in virtual environments requires skilled facilitation and well-designed activities (Harms, 2015; Warhuus et al., 2017).

- Assessment of learning outcomes: There is a need for robust, multidimensional assessment tools to measure the development of entrepreneurial competencies in virtual settings (Rodrigues, 2023; Gangi & Sirelkatim, 2023).

- Cultural and linguistic barriers: Effective intercultural communication and collaboration require intentional training and support (Deardorff, 2006; Bandera et al., 2018).

Future studies should look at long-term effects of virtual exchanges on business outcomes and work on creating models that can be used in different educational and cultural settings (Musteen et al., 2018; Myue, 2024).

To sum up, virtual exchanges are a great new way to teach that can make entrepreneurial education more accessible to everyone, promote global thinking, and give young people the skills they need to succeed in a world that is changing quickly. The experience of VEHUB4YOU and other research show how important it is to include virtual exchanges in formal curricula, help teachers and facilitators, and make sure that all students have equal access.

2.3. Economic behavior in education

The creation of international educational hubs for virtual exchanges represents a significant innovative initiative aimed at developing business and soft skills of the 21st century among modern youth. The VEHUB4YOU initiative illustrates how virtual hubs serve as catalysts for systemic change by embedding digital collaboration, cross-border exchange, and inclusive learning opportunities into the educational fabric of the 21st century.

Participation in international virtual exchange programs not only fosters the development of 21st-century business competencies among young people but also transforms their economic behavior, attitudes toward various events and situations, and decision-making in the economic sphere.

In contrast to short-term outcomes - primarily associated with immediate participation or the temporary acquisition of knowledge and skills through training - long-term impact refers to sustainable transformation across multiple levels and the creation of a global educational ecosystem. This ecosystem includes educational institutions of various levels, students and learners, facilitators who disseminate newly

acquired 21st-century skills, and individuals who modify their economic behavior within society.

The transformation of youth's economic behavior through the development of 21st-century business skills serves as a key indicator of social and educational change in society resulting from participation in virtual exchange programs.

Virtual exchange hubs directly contribute to the promotion of lifelong learning. Students acquire enduring competencies in digital literacy, intercultural communication, problem-solving, and entrepreneurial thinking. These competencies remain relevant far beyond the period of formal education and empower graduates to adapt to rapidly evolving labor market requirements. Thus, hubs create a bridge between higher education and lifelong employability, reinforcing the adaptability and resilience of learners in complex environments.

In the broadest sense, economic behavior can be defined as a set of goal-oriented optimizing or maximizing actions of an individual associated with choosing the most advantageous alternative (Vartanova, O., & Rovniahin, O., 2022). Economic behavior is understood as a system of interrelated processes and actions that reflect a person's attitude toward the conditions, content, and outcomes of socio-economic activity, manifested in behavior aimed at satisfying personal needs.

The economic behavior of young people as a system of economic decisions is formed under the influence of several factors:

- socio-economic context (economic crises, war, globalization);
- cultural models of thinking (values of Generations Y and Z);
- digital technologies, including international virtual educational exchanges.

Modern 21st-century business skills encompass critical thinking, entrepreneurial mindset, digital literacy, financial awareness, creativity, and communication. The economic behavior of young people demonstrates these skills in practice:

- rational economic decision-making → critical thinking and responsibility;
- saving and investing → financial literacy, strategic thinking, risk tolerance;

- participation in startups and freelancing → entrepreneurship, self-management, time management;

- social and business engagement → effective communication, tolerance for uncertainty;

- digital economic activity (online commerce, cryptocurrency, NFTs) → digital competence and innovativeness.

Across most European countries and globally, several trends are observed:

- young people tend to save less and invest more in new forms of business;
- the sharing economy culture is expanding (shared resources, rental, crowdfunding);
- the popularity of entrepreneurial education programs is increasing;
- interest in financial independence at an early age is growing.

These practices demonstrate the gradual convergence of economic behavior and the development of business skills essential for an innovative society.

However, despite positive trends, there are also risks:

- low financial literacy among certain youth groups → vulnerability to fraud and financial pyramids;
- excessive consumerism and credit dependency;
- limited communication skills, tendencies toward isolation, and unproductive forms of interaction;
- overestimation of quick-profit opportunities in the digital economy.

These risks highlight the need to integrate financial and entrepreneurial education into both formal and non-formal learning systems.

Thus, the economic behavior of youth serves as an important marker of 21st-century business skills development. It reflects levels of financial literacy, innovativeness, entrepreneurship, and readiness to face global challenges. Education, the social environment, and digital tools become key factors shaping the economic culture of the new generation. A systematic combination of educational programs and

innovative learning platforms promotes the development of youth economic behavior as a driver of sustainable economic growth.

The objective of diagnosing youth economic behavior was to assess changes in this behavior following participation in international virtual exchange programs. Research on youth economic behavior was conducted during 2022–2025.

The main research tasks were to:

- track dynamic changes in youth economic behavior as a marker of 21st-century business skills before and after participation in international virtual youth exchanges;
- determine the boundaries of rational and irrational economic behavior;
- identify the key factors influencing youth economic behavior.

To diagnose economic behavior, the psychodiagnostic method Consumer Behavior of Students (Savchenko, O. & Khtei, S.,2020) was applied. It allows for the assessment of four key aspects of consumer behavior (Savchenko, O. & Khtei, S.,2020):

1. Rationality of fund's distribution;
2. Orientation toward others' opinions;
3. Flexibility in choice;
4. Purchasing as a way of obtaining the desired.

Rational allocation of funds reflects individuals' tendency toward rational or irrational distribution of money when making purchase decisions - their willingness to carefully analyze needs and make informed consumer choices.

Orientation toward others' opinions and advertising evaluates students' level of independence in economic decisions and the extent to which external factors (advertising, peer influence, promotions, or marketing campaigns) affect their behavior.

Flexibility in choice characterizes behavioral variability - different methods of shopping (online/offline), payment (cash, digital systems), and the readiness to analyze information before purchase decisions.

Purchasing as a way of obtaining the desired measures the emotional dimension of consumption - the pursuit of satisfaction and fulfillment of current needs. This factor

evaluates the willingness to obtain the desired good by any means, including credit use, persistence, selective attention to information, disregard for income limitations, and attitudes toward discounts and brands.

The research sample consisted of 65 students from Kyiv National University of Technologies and Design, aged 18 to 49+, representing various educational levels (Bachelor, Master, PhD) and studying in specialties such as Management of Organizations, Public Administration, Business Administration, Innovation Management, and Marketing.

The results of the respondents' assessment using the Consumer Behavior of Students method (Vartanova O., 2021) are presented in Table 2.5.

Table 2.5. Results of the survey of economic behavior of students in 2021 (Vartanova O., 2021)

The severity of the factor	**Aspects of economic behavior**							
	F1. Rationality of fund's distribution		**F2. Focusing on the opinions of other**		**F3. Flexibility in choice**		**F4. Buying as desired**	
	N	%	N	%	N	%	N	%
High	13	20,0	47	72,3	13	20,0	15	23,07
Medium	42	64,6	13	20,0	43	66,15	43	66,15
Low	10	15,4	5	7,70	9	13,85	7	10,78

The interpretation of the students' responses across the aspects of the *Consumer Behavior of Students* questionnaire (O. Savchenko, S. Khtei) is presented below.

Aspect: *F1. Rationality of fund's distribution*

Within the study sample, respondents with an *average level* of rationality in allocating funds predominated (64.7%), compared to those with *low* or *high* levels of this factor ($\varphi^* = 5.36$; $\alpha \geq 0.99$). This indicates that most participants tend to distribute their money rationally when making everyday purchases, carefully considering and analyzing their spending decisions.

Aspect: F2. Focusing on the opinions of other

The findings show that individuals with a *high level* of orientation toward others' opinions (72.3%) significantly outnumbered those with a *moderate level* ($\varphi^* = 6.3$; $\alpha \geq 0.99$). Such individuals tend to be less independent in their economic behavior and seek social validation when making financial decisions - relying on advertising, peer reviews, advice, and expert opinions. They are more susceptible to external influence and marketing communications.

A minority of respondents (7.7%) were identified as independent decision-makers, basing their economic choices on personal opinions and criteria, while external factors such as advertising or others' views exerted minimal influence.

Aspect: F3. Flexibility in choice

Most respondents (66.15%) demonstrated a *moderate level* of flexibility in product selection, compared to those with a *low level* of flexibility ($\varphi^* = 6.5$; $\alpha \geq 0.99$). These individuals, depending on the situation, can either carefully weigh the advantages and disadvantages of economic alternatives or act irrationally in their decision-making.

Approximately 20.0% of respondents exhibited a *high level* of flexibility in product selection. This group showed adaptability across several dimensions - use of various payment methods (cash, multiple cards), diverse purchasing channels (online and offline), consideration of others' opinions and reviews, and readiness to make decisions based on thorough information analysis.

Respondents with a *low level* of flexibility (13.85%) were more traditional and conservative in their economic behavior, showing distrust toward novelty, risk aversion, and a tendency toward impulsive decisions.

Aspect: F4. Buying as desired

This factor reflects not rational or utilitarian behavior, but the desire to derive satisfaction from the process of consumption. The majority of respondents (66.15%) demonstrated a *moderate level* of this factor, outnumbering those with a *high level* (23.07%) ($\varphi^* = 5.11$; $\alpha \geq 0.99$). This suggests that although many respondents enjoy the purchasing process, they tend to make thoughtful and reasonable decisions - limiting consumption, avoiding credit use, reducing impulsive purchases, and

responding appropriately to discounts and promotions. However, 23.07% of respondents showed a *high level* of this factor, indicating a dominance of emotional consumption - the pursuit of pleasure, a desire to buy more than they can afford, the use of credit or loans, brand attachment, and distrust toward sales.

A minority of students (10.78%) shown a *low level* of this factor, reflecting a rational approach to consumption, consideration of financial capabilities, and a detailed evaluation of alternatives in purchasing goods and services.

To trace changes in youth economic behavior, a follow-up study was conducted in 2025 among students of Kyiv National University of Technologies and Design. The sample included 110 students aged 18–24, pursuing Bachelor's and Master's degrees in *Management* and *Business Administration*, who participated in international virtual exchange programs.

The results of the 2025 survey using the *Consumer Behavior of Students* methodology are presented in Table 2.6.

Table 2.6. Results of diagnostics of economic behavior of students in 2025
(Source: author's research according to (Savchenko, O. & Khtei, S., 2020)

The severity of the factor	Aspects of economic behavior							
	F1. Rationality of fund's distribution		F2. Focusing on the opinions of other		F3. Flexibility in choice		F4. Buying as desired	
	№	%	№	%	№	%	№	%
High	31	14,5	9	4,2	55	25,7	43	20,1
Medium	135	63,1	140	65,4	135	63,1	123	57,5
Low	48	22,4	65	30,4	24	11,2	48	22,4

Based on the results of the study of students' economic behavior in 2025, it can be concluded that the majority of students demonstrate moderate levels across all aspects of economic behavior. Most students (63.1%) exhibit a *moderate level of* Rationality of fund's distribution. A significant number (65.4%) show a *moderate level*

of orientation toward others' opinions in their economic behavior. Similarly, 63.1% of students demonstrate *moderate flexibility* in their economic decision-making.

Interestingly, the flexibility factor recorded the highest percentage (25.7%) of students displaying a *high level* of adaptability, suggesting that students, overall, are capable of adjusting their economic choices - a positive trait in a rapidly changing economic environment.

Most students (57.5%) show a moderate level in the factor Buying as desired, while 20.1% demonstrate a *high level*. This distribution suggests that although many students view purchasing as a means of satisfying desires, it is not a dominant behavioral trend.

Aspect: *F1. Rationality of fund's distribution*

The survey results indicate that respondents with a moderate level of rationality in financial distribution prevail (76.4%) compared with those showing high (20.9%) and low (2.7%) levels of this factor.

The proportion of individuals with a moderate level of the factor F1: Rational *allocation of funds* (76.4%) significantly exceeds that of those with a high level (23%) ($\varphi_{emp.} = 8.724$; $p \leq 0.01$) and a low level ($\varphi emp = 13.307$; $p \leq 0.01$).

Most respondents (76.4%) tend to allocate their financial resources rationally, carefully considering and analyzing their expenditures. About 20.9% show a lower inclination toward rational financial management and do not always analyze available alternatives, while 2.7% are irrational in financial decisions, prone to impulsive or automatic purchases.

Aspect: *F2. Focusing on the opinions of other*

The findings reveal that individuals with a *high level* of orientation toward others' opinions (66.4%) outnumber those with a *low level* (26.4%; $\varphi_{emp.} = 7.151$; $p \leq 0.01$) and those with a *very high* level (0.9%; $\varphi_{emp.} = 13.732$; $p \leq 0.01$).

A total of 26.4% of students demonstrate low levels of dependence on others' opinions and are more autonomous in their economic behavior. A small proportion (0.9%) exhibit high independence and rationality in decision-making, relying primarily

on personal opinions and internal criteria, while external influences – advertising, marketing, or peer pressure – have minimal effect.

Aspect: *F3. Flexibility in a choice.*

The majority of students (66.4%) display a *high level of flexibility* in their economic behavior. The number of students with high flexibility (66.4%) significantly exceeds those with a *moderate level* (32.7%; $\varphi_{emp.} = 5.089$; $p \leq 0.01$) and a *low level* (0.9%; $\phi emp = 12.706$; $p \leq 0.01$).

Students with low flexibility (0.9%) tend to be more traditional and conservative in their economic behavior - distrustful of new trends, hesitant toward spending, and risk-averse, although sometimes prone to impulsive purchases. A moderate level of flexibility was shown by 32.7% of the sample.

Aspect: F4. Buying as desired. Most students (85.4%) show a *moderate level* in this factor, indicating predominantly rational economic behavior. The share of students with a moderate level (85.4%) significantly exceeds that of respondents with *high* and *low* levels (7.3%) ($\varphi_{emp.} = 13.445$; $p \leq 0.01$).

A total of 7.3% of students exhibit a *high level* of this factor, emphasizing their desire for emotional satisfaction through consumption. Conversely, another 7.3% demonstrate a *low level*, reflecting a rational approach and strong self-control in economic decisions.

A comparative analysis of students' economic behavior before and after participation in international virtual exchange programs (2021 vs. 2025) is presented in Table 2.7.

Compared with the 2021 study of students' economic behavior (Table 2.5), there has been an increase in the proportion of students who allocate financial resources rationally. High levels of the factor F1. Rationality of fund's distribution were observed in 20.9% of respondents compared to 14.5% in 2021; the medium level rose from 63.1% to 76.4%, while the low level declined sharply from 22.4% to 2.7%.

Table 2.7. Results of the survey of students' economic behavior before and after participation in international virtual exchange programs (2021 and 2025)

The severity of the factor	Aspects of economic behavior							
	F1. Rationality of fund's distribution		F2. Focusing on the opinions of other		F3. Flexibility in choice		F4. Buying as desired	
	2021	2025	2021	2025	2021	2025	2021	2025
High	14,5	20,9	4,2	0,9	25,7	**66,4**	8	7,3
Medium	63,1	**76,4**	65,4	**72,7**	63,1	32,7	**94**	**85,4**
Low	22,4	2,7	30,4	26,40	11,2	0,9	8	7,3

Source: author's research

Thus, students have become more rational in managing their finances and demonstrate a higher degree of economic awareness as a result of participating in international virtual exchange programs.

In relation to the factor F2. Focusing on the opinions of other, there has been a marked shift in the proportion of students relying on social proof in their economic decision-making. Only 0.9% of students in 2025 showed a high level of dependence on others' opinions, compared with 4.2% in 2021 (a significant decrease). The proportion of students demonstrating a medium level increased to 72.7% from 65.4% in 2021, while the low level dropped from 30.4% to 26.4%. These results indicate a considerable reduction in the number of students requiring external validation when making financial decisions and an increase in those who act independently and autonomously in their economic behavior.

The factor F3. Flexibility in choice shows significant growth in adaptive behavior. In 2025, 66.4% of students demonstrated a high level of flexibility, compared to only 25.7% in 2021. The share of students with a medium level decreased from 63.1% to 32.7%, and those with a low level declined from 11.2% to 0.9%. This indicates a substantial increase in the number of students capable of adjusting their economic strategies, choosing appropriate payment tools and behavioral models - an effect clearly linked to participation in international virtual exchange programs. At the

same time, the proportion of students exhibiting inflexible, conservative economic behavior has decreased compared to 2021.

For the factor F4. Buying as desired, there was a slight decrease in the share of students exhibiting affect-driven consumption. In 2025, 7.3% of students showed a high level of this factor, compared with 8% in 2021; the medium level declined slightly from 94% to 85.4%, and the low level remained stable at 7.3% (compared with 8% in 2021). This suggests a minor reduction in the number of students demonstrating impulsive or pleasure-driven consumption patterns - a sign of increased rationality and self-regulation resulting from participation in virtual exchange programs. It is important to note that this aspect is largely psychological in nature and depends on individual personality traits.

The study demonstrates that youth economic behavior serves not only as an indicator of financial literacy but also as a key marker of 21st-century business-skill development. Participation in international virtual exchange programs (VEHUB4YOU) has contributed to the formation of more rational, conscious, and flexible economic behavior, reflecting the advancement of essential competencies such as critical thinking, entrepreneurial initiative, self-management, and digital literacy.

A comparative analysis of diagnostic results from 2021 and 2025 revealed a clear positive dynamic:

The proportion of students with medium and high levels of rational financial allocation increased from 84.6% to 97.3%, indicating stronger financial discipline and strategic thinking.

The influence of external factors (others' opinions, advertising, social trends) on students' economic behavior significantly decreased - from 72.3% to 0.9%, demonstrating greater autonomy and critical reasoning in financial decisions.

The level of flexibility in economic decision-making increased, reflecting adaptation to the digital economy and the growth of entrepreneurial thinking.

The proportion of students prone to emotional consumption decreased, confirming the formation of a conscious economic culture.

Overall, students' economic behavior has become more intentional, strategic, and adaptive, signaling an enhanced level of 21st-century business competence. International virtual education programs have proven to be an effective tool for developing economic thinking, fostering readiness for self-employment, startup engagement, and digital entrepreneurship.

Empirical data confirm that the long-term impact of virtual hubs lies not only in knowledge transfer but also in transforming economic behavior as a socio-psychological phenomenon that underpins young people's readiness to act responsibly, innovatively, and creatively in the economic environment.

Thus, economic behavior emerges as a marker of the socio-economic maturity of Generation Z, underscoring the need for further educational strategies aimed at integrating financial, entrepreneurial, and digital education into both formal and non-formal learning systems.

2.4. Virtual exchanges as catalysts for sustainable development: international experience and opportunities

In the context of globalisation and digitalisation of education, virtual exchanges are becoming a powerful tool for developing intercultural competence, digital skills and innovative entrepreneurship among students. They provide a platform for cooperation, knowledge and experience sharing, promoting sustainable development and inclusive education. Such exchanges can be a platform for social entrepreneurship: projects that address local or regional issues can receive feedback, resources and support through international partnerships.

Virtual exchanges are platforms where users (students, freelancers, companies, educational institutions) meet online, exchange projects, courses, case studies, resources, and collaborate remotely, with the main focus on employment and projects (freelancing), educational courses, joint projects and student exchanges, social entrepreneurship, consulting and mentoring meetings.

The COVID-19 pandemic has been an unprecedented challenge for modern society, causing radical changes in the organisation of work and educational processes and becoming a powerful catalyst for structural changes in the labour market and education system.

As a result of global lockdowns, the closure of educational institutions and the transition of businesses to remote working, there has been a rapid increase in the popularity of virtual exchanges – digital platforms that facilitate interaction between employers, contractors, teachers and students in a virtual environment. According to Upwork, in 2020, the number of freelancer registrations on the platform increased by 50% compared to the previous year. The total gross merchandise volume (GMV) on the platform in 2020 was $2.5 billion, which is 21% more than in 2019 (OECD, 2024). Thus, the transition of a significant part of the population, which was forced to switch to remote formats of professional activity and training, caused a rapid increase in the share of people involved in the digital platform economy – freelancing, microtasks, remote projects, as well as an increase in interest in massive open online courses (MOOCs) as a tool for acquiring new skills and further employment. To assess the dynamics of these processes, a generalised model has been constructed (Fig. 2.4), which reflects the change over time in the proportion of people working through online exchanges/platforms and the proportion of people who have taken online courses and obtained a job or promotion.

A comparative analysis of these indicators allows us to trace how educational activity in the digital environment is transformed into economic results, forming the phenomenon of the educational catalyst of labour.

An analysis of the data on the dynamics of digital labour and online educational platforms for 2015–2024 shows a clear trend of gradual growth in both indicators during the period under review, with a sharp jump in 2020, which correlates with the period of the global COVID-19 pandemic . It was at this time that remote forms of work and learning were introduced on a massive scale, which stimulated demand for digital platforms, including Upwork, Fiverr, Coursera, Udemy and others.

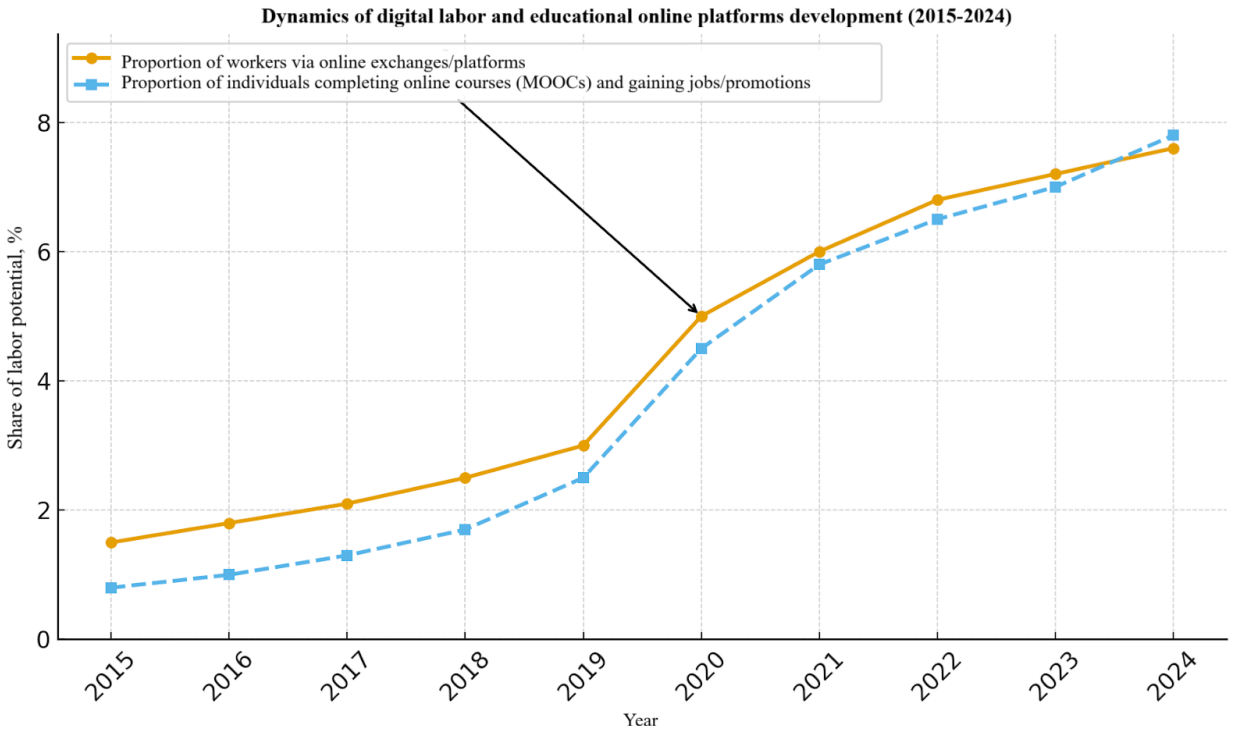

Fig. 2.4. Dynamics of the development of digital labour and online educational platforms (2015–2024)

After 2020, the dynamics stabilised but maintained a steady growth trend, indicating the institutionalisation of digital employment and the establishment of online education as a permanent mechanism for professional development. There is also a stronger link between educational activity and economic realisation: the growth in the proportion of people who have taken online courses and found a job or received a career promotion confirms the effectiveness of digital educational platforms as factors in increasing the competitiveness of the labour force. Thus, the results obtained indicate that online educational platforms act as a catalyst for the development of digital labour, contributing not only to higher employment rates but also to the formation of a new model of interaction between education and the labour market in the digital economy.

It is important not only to track the overall dynamics of growth in digital employment and online education, but also to identify social and spatial differences in these processes. Analysis of regional and social characteristics allows us to assess the level of digital inclusion, i.e. access to technology, the internet and educational

opportunities by different population groups. In particular, countries with developed infrastructure (urbanised regions, people with higher education) have higher levels of participation in online platforms in both employment and education. In contrast, rural residents and people with lower levels of education remain less involved in the digital economy, indicating digital inequality. Table 2.8 presents comparative indicators of digital employment and participation in online education by social group for 2024.

Table 2.8. Comparative indicators of digital employment and participation in online education by social group (2024) (OECD, 2024).

Social group	Percentage of people working through online platforms, %	Percentage of people who have completed online courses (MOOCs) and obtained a job/promotion, %
Urban population	9.2	8.5
Rural population	4	3.6
Persons with higher education	10.8	9
Persons with secondary education	5	4.4
Men	7	6.8
Women	6.9	6

Source: summarised based on the results of analytical studies of the digital economy and online education, 2024.

The COVID-19 pandemic has been a catalyst for the development of virtual exchanges and freelance platforms, contributing to changes in the structure of work and education. The increase in the number of new freelancers, the growth in demand for remote work, and the adaptation of educational processes to digital formats indicate the need for further development and integration of virtual exchanges into the global economic and educational space.

The COVID-19 pandemic has also significantly influenced the transformation of traditional models of work and education, stimulating the development of digital platforms that enable remote interaction between users. In the context of global lockdowns and restrictions on physical contact, particular attention has been paid to virtual labour exchanges.

Table 2.9. Virtual job exchanges and leading online education platforms that gained popularity during the COVID-19 pandemic

Category	Platform name	Description/Functions	Statistics / Results
Virtual job exchanges	Upwork	A platform for freelancers in various fields (IT, design, marketing, etc.).	145 million visits per month (2021).
	Freelancer.com	An international platform for searching for remote projects.	60 million users from 240+ countries.
	Fiverr	A platform for short-term digital services (gigs).	57% increase in revenue in 2022.
Virtual education platforms	Coursera	Online courses from universities and companies; certification.	The number of users has grown from 45 million (2019) to 92 million (2021).
	Udemy	Platform for professional and thematic courses.	Demand for online courses increased by 425% in March 2020.
	Google Classroom	A tool for organising distance learning.	150 million users worldwide.
	Zoom	Online meetings for training and webinars.	Daily audience grew from 10 million to over 300 million in 2020.
	LinkedIn Learning / Skillshare	A combination of learning and professional development, networking opportunities.	Growing popularity among professionals during the pandemic.

Analysis of the data presented (Table 2.9) allows us to draw an important conclusion that, firstly, the COVID-19 pandemic has significantly contributed to the popularisation of virtual labour exchanges, which provide the opportunity to carry out projects remotely and support professional activity in conditions of limited physical contact. In particular, platforms such as Upwork, Freelancer.com and Fiverr have shown significant growth in their user base and transaction volumes, demonstrating their effectiveness as a tool of the digital economy. Secondly, virtual educational platforms – Coursera, Udemy, Google Classroom, Zoom, LinkedIn Learning – ensured the continuity of the learning process for millions of pupils and students, and created new opportunities for professional development and improving digital skills. The growth in the number of users and activity on these platforms during the pandemic demonstrates their important role in shaping the modern educational environment. Thus, the information presented confirms that virtual platforms for both work and

learning have become key mechanisms for adapting to new socio-economic conditions, ensuring both professional activity and access to knowledge during a period of global restrictions. This indicates the lasting impact of the pandemic on the digital transformation of society and the formation of hybrid models of learning and working.

In order to test the hypothesis regarding the impact of the level of digital infrastructure on the scale of development of the platform economy, we conducted a comparative analysis of the relationship between internet access and the share of the population involved in work through online platforms in African and European countries. This approach allows us to identify the extent to which the institutional and technological readiness of society contributes to the establishment of virtual exchanges as instruments of sustainable economic development. The choice of regions is determined by the contrast between their socio-economic and digital characteristics. European countries, with their developed internet infrastructure, demonstrate a higher share of platform employment, which indicates the maturity of the digital environment and the effective integration of online exchanges into the labour market. Meanwhile, African countries, despite lower Internet coverage, show a similar growth trend, confirming the potential of virtual platforms as catalysts for socio-economic inclusion.

Thus, the scatter plot Correlation between internet access and platform employment share illustrates a direct positive relationship between the level of digitalisation of society and the population's active participation in the platform economy. The results empirically confirm the key thesis of the study: virtual labour exchanges are a driving force for sustainable development, as they create new employment opportunities even in countries with limited traditional infrastructure.

Analysis of the data obtained shows a clear positive correlation between the level of Internet access and the share of the population engaged in platform employment. This confirms that the development of digital infrastructure is a fundamental condition for the effective functioning of virtual exchanges as a component of the modern knowledge economy. European countries, where the average Internet penetration rate exceeds 90%, demonstrate established models of online employment that are integrated into national sustainable development strategies.

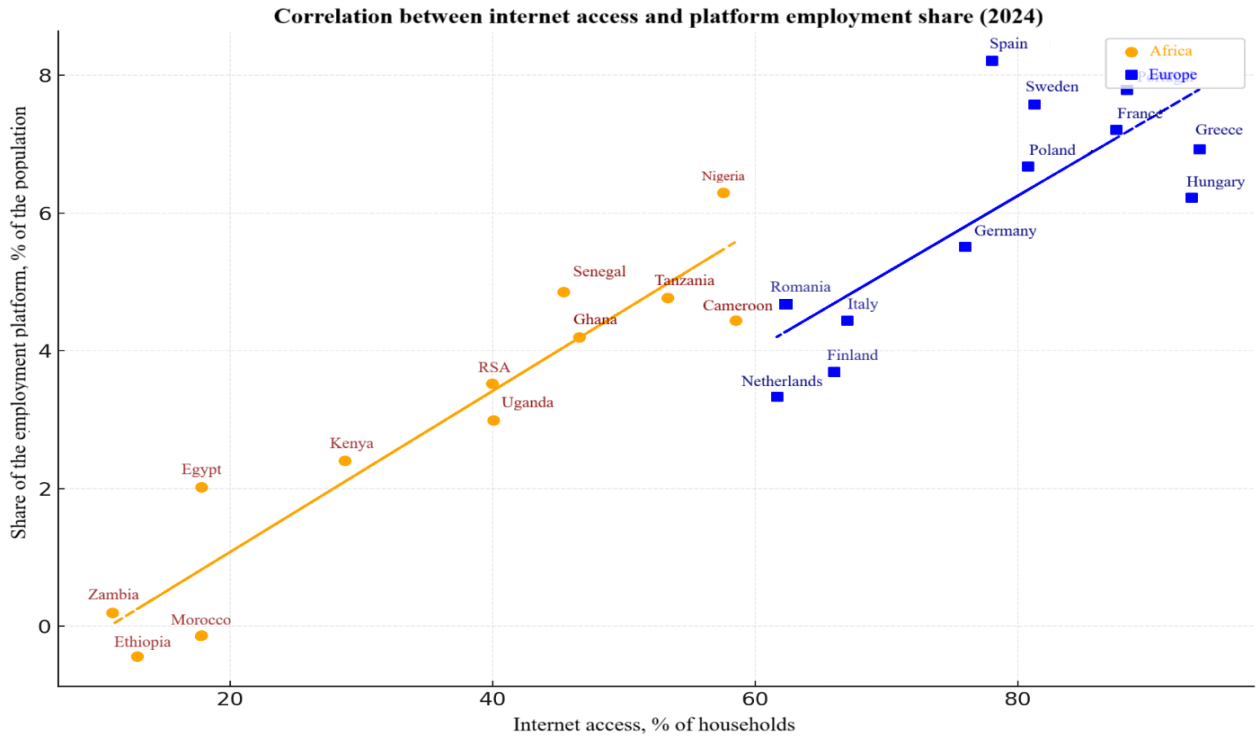

Fig. 2.5. Correlation between internet access and the share of platform employment in 2024 in African and European countries.

In turn, African countries, despite their lower level of digitalisation, demonstrate high adaptability to new forms of employment, which indicates the transformational potential of the platform economy even under structural constraints.

The results obtained emphasise that virtual exchanges are not only intermediaries between employers and employees, but also contribute to economic stability, inclusiveness and digital justice. In the context of sustainable development, they contribute to the diversification of income sources, the reduction of inequality in access to work, and the creation of new models of entrepreneurship based on remote collaboration. This trend points to the need to develop national strategies to support platform employment, aimed at developing the digital skills of the population, improving the regulatory framework and building trust in the online environment.

In the current context of the digitalisation of education and the globalisation of knowledge, virtual exchanges play an important role as a platform for international academic cooperation and the development of students' intercultural competences and practical skills. They allow students and teachers from different countries to come

together to work on projects and exchange knowledge and experience, promoting sustainable development and inclusive education. In order to systematise international experience with virtual exchanges, a number of the most successful initiatives were analysed, which could serve as models for implementation in domestic universities, particularly in Ukraine. Table 2.10 provides an overview of key platforms and programmes, their characteristics, as well as potential areas for sustainable development and use in the Ukrainian context.

Table 2.10. Overview of leading international platforms and their role in sustainable development

Programme/Platform	Brief description	Direction of sustainable development / potential use in Ukraine
UnaVEx (Una Europa Virtual Exchange)	Brings together students from Europe and Africa to address interdisciplinary and social issues; uses multinational teams, facilitators and participant certification	Support for intercultural and social development; implementation of interdisciplinary online projects in Ukraine, especially in ecology, social responsibility and inclusive education
Unite! Virtual Exchange / VECP	Allows students to take virtual courses from other partner universities of the Unite! alliance with ECTS credit recognition	Development of digital education and international academic mobility; adaptation for online courses with the possibility of distance learning and recognition of academic credits in Ukraine
APRU Virtual Student Exchange (VSE)	Joint courses and projects for students from the Pacific region, development of soft skills and cultural exchange	Support for cultural and professional exchange; use for the development of teamwork and intercultural communication skills among Ukrainian students
Arqus moVEs	Virtual courses at partner universities, preparation for international mobility	Preparation of students for international programmes and exchanges; possibility of introducing virtual preparatory courses for Ukrainian universities
COIL (UT Dallas)	Collaborative Online International Learning: students from different universities working on joint online projects	Support for innovative and project-oriented learning; adaptation for joint Ukrainian-international projects in the field of sustainable development, entrepreneurship and social initiatives

An analysis of international experience with virtual exchanges (Table 1.10) demonstrates their high effectiveness as a platform for intercultural and academic exchange, the development of key student competencies, and the promotion of sustainable development, as thousands of students participate in joint courses and

projects each year, confirming the ability of virtual exchanges to provide broad educational and social impact.

The COIL UT Dallas programme attracts over 2,000 students from 15 universities each year, while UnaVEx attracts over 500 students from Europe and Africa over two years. This demonstrates the effectiveness of virtual exchanges as catalysts for educational, social, and economic transformation. In particular, programmes such as UnaVEx, COIL, and APRU VSE show that multinational teams and joint online projects allow students to acquire practical skills in teamwork, critical thinking, and digital literacy. Statistics on participants in these platforms indicate the significant popularity of virtual exchanges: every year, thousands of students from different countries participate in joint courses and projects, confirming their ability to provide broad coverage and influence the educational environment. These data show that virtual exchanges effectively serve as catalysts for educational, social, and economic transformations, creating conditions for the integration of students into the global educational environment and promoting the implementation of sustainable development principles in education. In addition, they demonstrate the potential for adaptation and implementation in domestic universities, including Ukrainian higher education institutions, to develop the competencies needed in today's globalised world.

International experience shows that the digitalisation of labour relations and education leads to profound structural changes in the labour market. Countries that actively integrate virtual employment models demonstrate growth in self-employment, increased labour mobility and expanded opportunities for professional development. One of the key rules for achieving sustainable development goals is to ensure decent work and expand opportunities for self-realisation in the digital economy. The use of innovative technologies in the field of employment and education allows economic growth to be combined with social inclusion. The development of virtual freelance exchanges and educational platforms is shaping a new sector of the digital economy in which jobs are created that are independent of geographical boundaries.

The development of virtual freelance exchanges and educational platforms is forming a new sector of the digital economy, in which jobs are created that are

independent of geographical boundaries. These tools provide opportunities for self-employment, stimulate the development of entrepreneurship and contribute to the emergence of innovative business models. This is particularly important for countries with transitional economies, as it allows them to diversify the structure of employment, increase labour market flexibility and attract human capital to the global economic cycle. Virtual exchanges and online platforms create conditions for access to work and education for representatives of various social groups – young people, women, people with disabilities, and residents of remote regions. They reduce barriers to entry into the labour market, promote gender equality and digital inclusion, and increase social mobility and opportunities for professional self-realisation. This approach is in line with the UN Sustainable Development Goals, particularly those relating to decent work, education and reducing inequality. The integration of online projects, platforms and virtual educational environments promotes the development of digital literacy, critical thinking, intercultural communication and professional competencies among students and specialists. Online educational platforms are becoming not only a source of knowledge, but also an environment for developing skills to adapt to new economic conditions, which meets the requirements of the labour market of the future. This process ensures the qualitative renewal of human capital, strengthening the competitiveness of national economies. Remote work and learning, characteristic of virtual exchanges and online platforms, reduces the need for transport, energy and resource consumption, thereby contributing to a reduction in the carbon footprint. The spread of remote employment and digital learning formats is part of the green economy, as it combines innovation with environmental responsibility. Virtual labour exchanges and educational platforms act as a mechanism for integrating national economies into the global digital and educational space. They create conditions for international cooperation, knowledge exchange, joint research and the development of digital ecosystems. Such integration strengthens countries' positions in the global knowledge economy and promotes sustainable growth through innovation, education and technological cooperation.

Thus, virtual labour and education exchanges are powerful catalysts for sustainable development, combining economic, social and environmental dimensions of progress. They contribute to the formation of a new model of inclusive development based on knowledge, innovation and digital competencies. 's support for such platforms at the level of state policy and international partnership is of strategic importance for ensuring the competitiveness, social cohesion and environmental responsibility of society in the context of digital transformation.

CHAPTER 3

BEST PRACTICES IN ORGANIZING VIRTUAL BUSINESS HUBS

3.1. VEHUB4YOU Project case study

The structure of the VEHUB4YOU Project Case Study includes:

- Introduction - the relevance and significance of the project in the context of contemporary educational and entrepreneurial challenges, the alignment of the initiative with key European strategies and policies, including digital transformation, innovation-driven education, and cross-border cooperation frameworks;

- Goals, objectives and rationale - the core aims and specific objectives of the project, supported by a comprehensive needs analysis and an assessment of its strategic importance at both regional and European levels;

- Description of the VEHUB4YOU project - the conceptual framework and main idea of the project will be described, including the identification of target groups, the underlying pedagogical and entrepreneurial principles, and the innovative concept of creating a network of virtual business hubs;

- Implementation methodology - a detailed overview of the methodological approach, including the training models employed, digital technologies integrated, and the sequential stages of project implementation;

- Partnership and governance - the project consortium, roles and responsibilities of the partner institutions, and the decision-making structures established to ensure effective coordination, transparent governance, and smooth project delivery;

- Expected results and impact - the anticipated outcomes of the project, differentiating between short-term deliverables, medium-term achievements, and long-term systemic impacts on business education, digital learning infrastructure, and European collaboration;

- Communication and dissemination of results - the communication strategy, dissemination channels, and formats used (e.g., scientific publications, social media,

webinars, conferences) to ensure broad visibility, stakeholder engagement, and knowledge transfer;

- Sustainability and continuation of the project after the end of funding - the long-term sustainability of project results, including strategies for institutional integration, policy uptake, and potential scalability beyond the project's funding period;

- Conclusions and recommendations - the key findings and lessons learned, providing practical recommendations.

In the modern era of globalization, digital transformation and rapid development of information technology, the education system around the world is undergoing profound changes. New realities require not only updating curricula and teaching approaches, but also creating innovative interaction formats that would ensure equal access to knowledge for all categories of the population, regardless of geographic location, socioeconomic status, or level of physical mobility. Special attention should be paid to young people, who are the driving force behind economic development and innovative changes (European Commission, 2021).

In this context, the European Union's programs, in particular Erasmus+, are important platforms for introducing the latest educational practices, international cooperation and cultural exchange. The Erasmus+ program not only supports academic mobility, but also promotes sustainable partnerships between educational institutions, NGOs, and businesses (European Commission, 2021). One of the innovative projects implemented under this program is VEHUB4YOU, the International Network of Virtual Youth Business Hubs.

The VEHUB4YOU project aims to develop entrepreneurial competencies, digital literacy, and intercultural dialogue among young people in Ukraine and Azerbaijan. It combines online education, interactive technologies and networking to create a new model of access to knowledge and practical experience. Participants have the opportunity to study in mixed international groups, participate in trainings, workshops, and project assignments, and interact with mentors and experts from different countries (VEHUB4YOU, 2025).

The relevance of this project is due to a number of factors. First, in the current context of global mobility, educational and professional opportunities should be available regardless of physical presence in a particular country or educational institution. Secondly, the economic and political situation in the regions, particularly in Ukraine and Azerbaijan, often limits the opportunities for young people to directly participate in international educational programs. Thirdly, the COVID-19 pandemic has shown the importance of flexible learning formats and the rapid adaptation of educational processes to a remote mode (European Union, 2019; Van Vuuren, W. J. et al., 2025).

VEHUB4YOU meets these challenges by integrating the experience of European educational institutions with the local needs of target groups. The project creates a sustainable infrastructure for virtual exchanges using modern digital platforms, interactive learning materials, and practical cases from the real business environment. Thus, it contributes not only to the development of professional skills but also to the formation of values of openness, tolerance, and intercultural understanding (Organisation for Economic Cooperation and Development (OECD), 2019)).

In addition, the project is of strategic importance for the implementation of European policy in the field of youth and educational integration, as it promotes cooperation between partner countries and the formation of international communities capable of generating new ideas, startups, and social initiatives. The partner organizations involved in VEHUB4YOU combine academic potential, business expertise, and experience in implementing international projects, which guarantees a high level of quality and sustainability of the results obtained (VEHUB4YOU, 2025; Ministry of Education and Science of Ukraine, 2020).

Thus, VEHUB4YOU is a response to modern challenges in education and entrepreneurship and an example of how international partnerships and digital technologies can become a powerful tool for the development of youth and society as a whole.

The goal of the project is to create a network of international virtual business hubs for entrepreneurship training for young people aged 13-30 through the integration of modern educational methods and digital technologies.

The main tasks include (VEHUB4YOU, 2025):

- organizing 60 virtual business hubs in Ukraine and Azerbaijan;
- conducting trainings for facilitators and managers of the hubs;
- development of online courses on business education and entrepreneurship;
- organizing international virtual exchanges and joint projects;
- popularizing entrepreneurial culture among young people.

The project rationale is grounded in the outcomes of empirical research, carried out in the form of a structured questionnaire survey among key representatives of the target audiences, including educators, academic staff, and stakeholders in the field of business education. The survey, which was conducted in accordance with established methodological standards for data collection and analysis, revealed a high level of expressed demand for the modernization of educational practices. In particular, over 83% of the surveyed teachers and 86% of respondents from the broader target groups demonstrated a positive attitude toward and explicit interest in the integration of European virtual learning practices into the existing national educational framework (VEHUB4YOU, 2025).

These findings provide strong evidence of a substantiated social and professional demand for innovation in business education, reflecting a growing recognition of the importance of aligning local curricula with European standards and digital transformation trends in higher and vocational education. Furthermore, the high response rates and consistency of results across different categories of respondents reinforce the validity and reliability of the collected data.

Consequently, the obtained empirical evidence became the foundational basis for defining the strategic priorities and methodological framework of the project. It guided the identification of key areas for the adaptation, implementation, and localization of best practices in virtual learning, previously validated within the European Union, particularly those aligned with the principles of lifelong learning, open education, and

the European Higher Education Area (EHEA) (VEHUB4YOU, 2025; European Commission, 2021).

This evidence-based approach ensures that the project's objectives are not only theoretically justified but also socially relevant, timely, and responsive to the contemporary challenges of digital transformation and European integration in education.

Project description. The international educational project VEHUB4YOU is an innovative initiative aimed at creating a network of virtual youth business hubs that use digital technologies to develop entrepreneurial competencies among young people. The idea of the project is to integrate educational, mentoring, and incubation services into a single platform that provides access to knowledge, resources, and international markets. This approach is in line with current trends in digital entrepreneurship, where young entrepreneurs are actively using online platforms to develop their business ideas.

The VEHUB4YOU project is implemented by a consortium of educational institutions and NGOs, which includes: Kyiv National University of Technologies and Design (Ukraine) - initiator; University of Foggia (Italy) - coordinator; RISEBA University of Applied Sciences (Latvia); Mingachevir State University (Azerbaijan); Institute for Social and Economic Initiatives (Ukraine) and Kyiv Educational and Training Youth Center (Ukraine).

The project was the first in Ukraine to be awarded an Erasmus+ Virtual Exchanges grant, which emphasizes its innovation and strategic importance for the integration of Ukrainian education into the European space. VEHUB4YOU aims to create a safe digital environment for intercultural dialogue and soft skills development. The format involves mixed international groups of participants, synchronous and asynchronous interaction through Zoom, Google Meet, Moodle, and business simulation games.

The project is aimed at young people aged 13-30 - schoolchildren, college and university students of both economic and non-economic specialties. Particular attention is paid to bridging educational gaps in regional schools and universities in Ukraine and Azerbaijan, where access to quality courses in entrepreneurship and economics is limited. In addition, the project's target groups are also youth

organizations and business incubators that can integrate into the hub network to implement joint projects and develop local entrepreneurial initiatives. An important role is played by mentors, trainers, and experts who provide with advice, conduct training events, and promote the professional growth of participants, providing effective support to young people in the formation and implementation of business ideas.

VEHUB4YOU is creating a network of 60 virtual business hubs based at schools, universities and libraries in Ukraine and Azerbaijan. The project also provides for the training of facilitators and trainers of virtual hubs: more than 80% of the surveyed teachers expressed their willingness to join the project and integrate new European business education practices in their institutions. The project is expected to result not only in the formation of a network of business hubs, but also in the involvement of at least 2,500 participants from different regions, including the Southern Neighborhood and sub-Saharan Africa. This scale allows VEHUB4YOU to claim the role of a model that can be replicated in other countries seeking to combine modern business education with digital technologies and international cooperation.

The concept of a network of virtual business hubs is based on a combination of a virtual platform and local partner centers. The virtual platform provides access to (VEHUB4YOU, 2025):

- modular training programs, webinars, and workshops on the basics of entrepreneurship, startup management, marketing, and finance

- tools for interaction between participants, exchange of experience, and joint work on projects;

- international cooperation, which brings together young people from different countries to share knowledge and experience.

Local hubs, represented by universities, youth centers, and business incubators, serve as regional nodes of the network where participants can participate in practical offline events such as workshops, trainings, startup competitions, and business

meetings. This approach contributes to the development of entrepreneurial competencies and the formation of an active youth community.

Key activities include:

- development of teamwork, critical thinking, communication and foreign language skills;

- organizing startup project competitions for pupils and students, the winners of which will have the opportunity to present their ideas at European universities;

- strengthening international relations of Ukrainian and Azerbaijani educational institutions with European partners.

A unique component of VEHUB4YOU is a professional development program for teachers and coordinators, which involves the use of information and communication and digital technologies in the educational process. Thanks to it, teachers gain new knowledge and tools that allow them to qualitatively modernize educational programs and introduce entrepreneurial training in educational institutions. It is important to note that such a program has a long-term effect, as it forms a professional environment of innovative teachers who become leaders of change in their educational institutions.

Thus, VEHUB4YOU not only meets the global challenges of the digital age, but also creates sustainable mechanisms for integrating young people in Ukraine and Azerbaijan into the global educational and entrepreneurial space.

Implementation methodology. The methodological framework of VEHUB4YOU includes:

- synchronous formats (online meetings, workshops, debates);

- asynchronous formats (massive open online courses, video lectures, tests);

- project-based learning (creation of business plans, startups, participation in case championships);

- facilitated discussions to develop critical thinking and communication skills.

The stages of the VEHUB4YOU project implementation include the sequential implementation of several key phases, namely: the preparatory stage, the launch of hubs, the educational process, and international exchanges.

The preparatory phase involves the formation of an international team of executives and coordinators, the development of curricula, trainings, and methodological materials, and the identification of the needs of target groups.

The next step is the launch of the hubs, which involves creating a network of 60 virtual business centers based on schools, universities, and youth organizations in Ukraine and Azerbaijan, organizing their technical support, and training facilitators to ensure effective work.

The next stage involves the actual learning process, which includes online courses, workshops, practical classes, and debates that combine elements of formal and non-formal education. Participants acquire the entrepreneurial, communication, and digital skills necessary to create their own business initiatives.

The final stage is international exchanges involving joint projects of Ukrainian, Azerbaijani, and European participants. In this context, the emphasis is on the development of startups, participation in case championships and business idea competitions, as well as intercultural interaction and the introduction of European educational practices in the field of entrepreneurial education.

Partnership and management. The governance of the VEHUB4YOU project is structured around two principal organizational bodies designed to ensure strategic alignment, operational efficiency, and quality assurance throughout the implementation process:

1. The Steering Committee (SC) – This body is entrusted with strategic decision-making, project planning, and overall coordination. It establishes the long-term vision of the initiative, approves work plans, allocates resources, and monitors the fulfillment of key milestones.

2. The Quality Board (QB) – This structure is responsible for systematic monitoring, evaluation, and quality control, ensuring compliance with established

performance indicators, methodological rigor, and European standards in virtual learning and business education.

Each consortium partner operates within a clearly delineated scope of responsibilities, contributing to specific dimensions of the project:

- Course development partners design and update training materials, adapt content to the needs of the identified target groups, and ensure the curricula remain relevant, evidence-based, and innovative.

- The technical team oversees the continuous functioning and improvement of the online learning platforms, facilitates the integration of cutting-edge educational technologies, and provides technical support to partners and participants.

- The communication team develops and executes a comprehensive strategy for stakeholder engagement, outreach, and dissemination, utilizing diverse communication channels and media.

- The monitoring and evaluation team conducts regular assessments, collects quantitative and qualitative data, and provides analytical feedback to enhance the effectiveness and scalability of the project.

Decision-making mechanisms are designed to promote transparency, accountability, and shared responsibility. They include:

- regular online coordination meetings for status updates and discussion of emerging challenges;

- approval of implementation plans and deliverables through secure online platforms;

- formal documentation of decisions in the form of meeting minutes, assigning responsible persons and deadlines;

- systematic progress reporting at predefined intervals to facilitate data-driven management.

This governance framework ensures effective inter-institutional collaboration, facilitates the timely achievement of project objectives, and upholds high-quality standards by integrating academic expertise in monitoring with practical project management tools. As a result, VEHUB4YOU serves as a replicable model for managing international educational initiatives, combining evidence-based decision-making, participatory governance, and continuous quality enhancement.

Expected results and impact. The implementation of the VEHUB4YOU project has led to a number of important results in the short, medium, and long term.

In the short term, a network of more than 60 virtual business hubs was successfully launched, which have become innovative platforms for youth entrepreneurship development. One of the key achievements was the training of certified trainers and facilitators who ensured the high quality of educational programs and professional support for participants. More than 2,000 young people took part in the training and counseling events, significantly improving their digital and entrepreneurial competencies. As a result, an active community of young innovators has been formed, capable of generating and implementing their own business ideas.

In the medium term, the project's results will be tangible through the integration of business education into regional curricula, which will increase the practical value of educational courses and strengthen their focus on modern market needs. At the same time, a sustainable entrepreneurial culture will be formed among young people, which will manifest itself in increased motivation to launch startups, more active participation in innovative projects, and the development of creative initiatives. The project will also facilitate the creation of international educational partnerships that will open up access to transnational knowledge, practices, and resources to , providing participants with better opportunities for future professional fulfillment.

In the long term, the results of VEHUB4YOU are expected to manifest themselves in increased youth employment, which will result from the launch of new entrepreneurial initiatives and increased competitiveness of graduates in the European and global labor markets. The economic activity of the regions received a significant boost due to the creation of small and medium-sized businesses, which became a driver

of local development. At the same time, the project helped to strengthen Ukraine's role in the European educational space, as the integration of universities and youth organizations into international networks has significantly improved the quality of educational processes and brought them closer to the requirements of the knowledge economy.

Thus, VEHUB4YOU has become an example of a successful international educational and innovation initiative that has demonstrated how well-organized virtual business hubs can influence not only the development of individual participants but also the transformation of the country's educational environment as a whole.

Communication and dissemination of results. The VEHUB4YOU project implemented a comprehensive and multi-level communication and dissemination strategy that included both traditional academic tools and modern digital channels. The main objective of this strategy was to ensure maximum visibility, accessibility and impact of the results obtained among various target audiences, including educators, researchers, policy makers, business representatives and the public.

Information and communication coverage was carried out through the official web resources of partner organizations, as well as popular social media platforms such as Facebook, Instagram, LinkedIn, TikTok, and YouTube. Additional communication channels were mobile and messenger platforms, including Viber and Telegram, which ensured prompt and interactive interaction with the audience (vehub4you.com).

As part of the project, a significant amount of educational, methodological, and scientific materials was created and disseminated, including:

- methodological recommendations for educational institutions and teache
- complete curricula focused on the integration of European approaches to entrepreneurship and innovation;
- a monograph summarizing the final results of the project research and implementation.

These materials have become a relevant resource for both the academic community and practitioners working in the areas of innovation education, entrepreneurial development, and international cooperation.

Of particular importance in the dissemination strategy were publications in scientific journals, which ensured their peer review and recognition by the international scientific community. In addition, international scientific and practical events were organized, including conferences, roundtables, workshops, and thematic discussions, which facilitated the exchange of knowledge between the countries of the European Union and the Eastern Partnership.

Thus, VEHUB4YOU's communication strategy combined traditional academic practices (scientific publications, conferences, teaching materials) with innovative digital tools (social media, multimedia content, online platforms), which significantly increased the visibility, impact, and long-term availability of the created educational products in both local and international contexts.

Sustainability and continuation of the project. Upon completion of the project funding, it is planned to ensure the sustainable operation of all established business hubs based on the educational institutions that participated in the project. These hubs will continue to serve as innovative educational and practical platforms where students and young entrepreneurs will be able to implement their business ideas, get advice from mentors, and participate in trainings and workshops. The developed courses will be integrated into the official curricula of universities and colleges, which will ensure systematic access to modern entrepreneurship and digital competencies for students.

At the same time, it is planned to regularly update training materials, guidelines, and online courses to reflect changes in the market environment, technological innovations, and the latest educational practices. This will help maintain the relevance and practical orientation of educational products, as well as improve the quality of youth preparation for the real business environment. In addition, it is planned to continue international exchanges, participation in joint projects and conferences by attracting other grant programs, partnership initiatives, and commercial educational services. This approach will ensure not only the sustainability of the hub network but

also the gradual expansion of opportunities for international cooperation, knowledge and practice exchange, which will help to form a new generation of entrepreneurs with a high level of competence and global vision.

Thus, even after the completion of the initial funding, the VEHUB4YOU project will be able to maintain its impact on the educational environment and economic development of the regions, providing long-term support for youth entrepreneurship, integrating innovative curricula, and strengthening international educational ties.

The VEHUB4YOU project is an innovative international initiative that combines digital technologies, business education, and intercultural communication. It aims to create a sustainable network of virtual business hubs that provide young people with modern competencies in entrepreneurship, management and digital technologies. The project is in line with the strategic priorities of the Erasmus+ program, in particular, supporting youth entrepreneurship, intercultural exchange, and the integration of innovative educational practices.

Although the main participants in the project are young people in Ukraine and Azerbaijan, VEHUB4YOU has the potential to expand its impact to other regions of Europe, the Southern Partnership countries, and sub-Saharan Africa. The involvement of participants from different cultural and economic contexts facilitates the exchange of best practices, the formation of an international support network for startups, and the development of a global entrepreneurial community. The project also creates opportunities to integrate scientific and practical methods into regional curricula and exchange experience with educational institutions and youth organizations outside of Ukraine and Azerbaijan, making it an example of a successful transnational educational initiative.

As a result, VEHUB4YOU not only strengthens youth competencies in entrepreneurship and digital technologies, but also promotes international cooperation, the development of innovative educational programs, and support for educational activities in partner regions. The involvement of participants from sub-Saharan Africa allows the project to disseminate best practices in entrepreneurship and business

education on a global scale, creating a platform for the sustainable development of youth entrepreneurship on several continents simultaneously.

As for recommendations for further development of the project, there are several key areas. First, it is necessary to ensure the sustainable functioning of the established hubs in educational institutions, including the integration of courses into official curricula and regular updating of training materials. Second, it is worth continuing to organize international conferences, roundtables, and workshops to share experiences and demonstrate best practices, as well as to attract new partners and participants from other regions. Third, it is recommended to develop and disseminate guidelines for the implementation of virtual educational platforms in the business education system to facilitate the project's scaling to other countries and continents.

In addition, it is advisable to expand the communication strategy by using the official websites of partners, social networks (Facebook, Instagram, LinkedIn, TikTok, YouTube), publications in scientific journals and online platforms, as well as organizing webinars and series of distance courses. This will help maintain a high level of project visibility, attract new participants, and ensure a long-term impact on the development of youth entrepreneurship. Particular attention is recommended to be paid to strengthening the scientific publication activity of project participants, including the preparation and publication of articles in international journals, the development of methodological monographs and reports on the results of the hubs' implementation. This will not only ensure the visibility and academic value of the project, but also help increase its impact on the scientific and educational community.

Thus, the implementation of these recommendations will ensure not only the sustainability of existing hubs, but also the gradual spread of VEHUB4YOU best practices on a global scale, contributing to the development of youth competencies, international cooperation, and Ukraine's integration into the global educational space.

3.2. Key success factors in virtual business hubs

In the last ten years, the digital transformation of entrepreneurial education has sped up quickly thanks to improvements in cloud technology, global connectivity, and the need for learning environments that can grow and change with the needs of students. Virtual Youth Business Hubs (VYBHs) have become a strong response to these trends. They are open to everyone and don't have any borders, which makes it easier for people from different backgrounds to learn about entrepreneurship and come up with new ideas (Kickul & Lyons, 2012; Kollmann et al., 2022). These hubs are more than just digital versions of real-life incubators; they are a new way of teaching business skills that uses technology, teaching methods, and community to create dynamic ecosystems for business education (Bandera et al., 2018; Luik et al., 2019).

The VEHUB4YOU project, which links Italy, Ukraine, Azerbaijan, and Latvia, is a great example of how virtual hubs can help young people in both cities and rural areas become entrepreneurs. But these kinds of projects don't always work out. Both academic research and real-world experience agree that effective virtual business hubs need strong technological infrastructure, new teaching methods, skilled human facilitation, active community involvement, and strong governance systems (Isenberg, 2011; Cohen, 2006; Sparkes et al., 2019; Luik et al., 2019).

The entrepreneurial ecosystem model (Isenberg, 2011; Stam & Spigel, 2016) and the Community of Inquiry model (Garrison et al., 2000) are two examples of theoretical frameworks that can help us understand how these success factors work together. The ecosystem approach stresses the importance of leadership, money, culture, and support services. The Community of Inquiry framework, on the other hand, stresses how cognitive, social, and teaching presence all work together in online learning environments. These models show how important it is to have comprehensive, multi-level plans that combine technology, teaching, and people (Luik et al., 2019; Sun & Chen, 2016).

Studies show that virtual hubs with strong digital infrastructure, hands-on and project-based curricula, structured mentoring, and active peer groups have higher

levels of engagement, learning outcomes, and entrepreneurial intentions (Nabi et al., 2017; Musteen et al., 2018; Luik et al., 2019). For example, the Italian hubs in VEHUB4YOU have shown that being flexible, welcoming, and combining global best practices with local needs are all important for success.

This chapter goes through the main things that make virtual business hubs work well in a logical way. It gives a conceptual and practical framework for design, implementation, and ongoing improvement. The study uses peer-reviewed research, international benchmarks, and data from the VEHUB4YOU pilots to give insights that can be used in many different educational and business settings.

Any successful virtual business hub needs a strong, flexible, and user-centered tech infrastructure as its base. The research consistently shows that user satisfaction, engagement, and learning outcomes are directly related to the quality, reliability, and inclusiveness of digital platforms (Sun & Chen, 2016; Norman, 2013). The technological infrastructure for virtual entrepreneurship education must ensure that students can always access the materials, work together easily, and do a wide range of teaching activities, such as synchronous workshops and mentoring, asynchronous project work, and peer feedback (Kollmann et al., 2022; Coates, 2014).

Cloud-based architectures, like those built on Amazon Web Services or Microsoft Azure, let you easily scale up or down and distribute load, so hubs can handle changes in the number of users and activity without losing performance (Armbrust et al., 2010). This ability to scale is especially important for international projects like VEHUB4YOU, which needs to be able to support people from different time zones and levels of digital skill.

Design that focuses on people is just as important. Platforms must follow accessibility standards, like WCAG 2.1, and have interfaces that are easy to use and respond quickly to users with different needs (Norman, 2013; W3C, 2018). Clear navigation, language options, and assistive technologies are important for making sure everyone is included and treated fairly in multicultural and multilingual settings (Luik et al., 2019).

Interoperability is another important part of good infrastructure. Learning Tools Interoperability (LTI) and xAPI protocols work together to make it easy for different educational tools to connect and collect data in real time for analytics. This helps with personalized learning pathways and adaptive feedback (Coates, 2014; Pane et al., 2017). More and more, data-driven methods are being used to find at-risk participants early in the learning process and to make things better all the time.

You can't give up security and privacy. To build trust and make sure things last, you need to follow GDPR rules and have strong data protection policies in place, especially when dealing with private and business information (Rodrigues, 2023; European Commission, 2018).

The VEHUB4YOU project shows that virtual hubs with flexible digital infrastructure get more people involved, keep more people in school, and help them learn better. For instance, Italian and partner hubs have been able to keep high levels of participation and satisfaction even during times of high demand or technical difficulty by using cloud-based collaborative platforms and offering regular technical support and digital skills workshops (VEHUB4YOU Consortium, 2024).

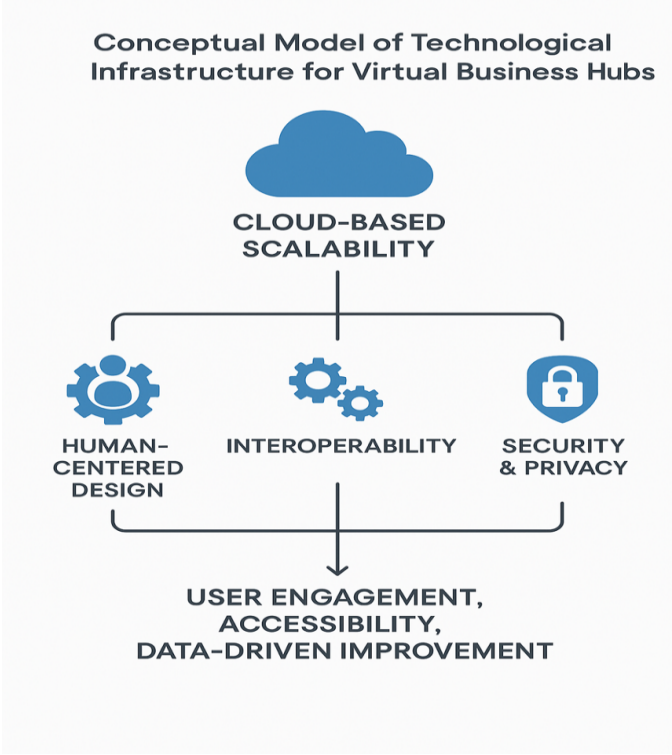

Fig. 3.1. Essential Components of Technological Infrastructure for Virtual Business Hubs. Authors' elaboration

The way that virtual business hubs plan their lessons and teach them is very important for helping young people develop their entrepreneurial skills, digital skills, and creative ways of thinking. Entrepreneurship education research shows that traditional teaching methods that focus on passive knowledge transfer are not enough to teach the complex, adaptable skills needed in today's digital and globalized economy (Lackéus, 2015; Nabi et al., 2017). Instead, effective virtual hubs use experiential, project-based, and problem-based learning models that are based on strong theoretical frameworks and are in line with internationally recognized competence standards like the EntreComp Framework (European Commission, 2018).

Kolb's (1984) cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation is the basis for experiential learning, which is widely regarded as the best way to teach entrepreneurship (Kolb, 1984; Motta & Ribeiro, 2023). In virtual business hubs, this means that the curriculum focuses on real-world problems, business simulations, entrepreneurial projects, and iterative prototyping. These kinds of activities improve not only cognitive and practical skills, but also emotional engagement, resilience, and a growth mindset (Cascavilla et al., 2022; Hahn et al., 2017).

Project-based learning (PBL) and problem-based learning (PrBL) are especially good for online settings because they put students in real-life business situations where they have to work together, think critically, and come up with creative solutions to problems (Barrows, 1996; Hmelo-Silver, 2004; Musteen et al., 2018). When used with digital tools for collaboration and feedback, these methods are shown to boost self-efficacy, opportunity recognition, and the desire to start a business (Hunter & Lean, 2018; Pittaway & Cope, 2007).

The EntreComp Framework (European Commission, 2018) is now a key part of designing entrepreneurship education programs in Europe and beyond. It breaks down entrepreneurial skills into three areas: Ideas and Opportunities, Resources, and Into Action. Each area is defined by specific learning outcomes and assessment rubrics. Virtual hubs that align curricula with EntreComp are better able to make sure that

learning outcomes are consistent, comparable, and transferable across different settings (Jardim, 2021; Cascavilla et al., 2022).

For example, the curriculum in VEHUB4YOU is based on EntreComp and includes modules on finding opportunities, using resources, understanding money, making ethical decisions, and coming up with new ideas that are good for the environment. This modular approach lets you be flexible and follow the same rules, so you can meet local needs while keeping a common level of competence (VEHUB4YOU Consortium, 2024).

Since virtual business hubs are digital, they may implement advanced learning tools like business simulation software, virtual pitching platforms, and tools for managing projects with others (Kollmann et al., 2022; Pane et al., 2017). These tools not only mimic real-world business settings, but they also let you customize learning experiences based on data and scale (Coates, 2014). For example, VEHUB4YOU has simulation-based modules that let users run virtual startups, make strategic decisions, and get instant feedback on how well they are doing. This helps them learn by doing and thinking about what they did.

Significant impact virtual hubs are different from other types of hubs because they always include mentoring, coaching, and peer-to-peer learning (St-Jean & Audet, 2012; Eby et al., 2008). Structured mentoring networks link students with seasoned businesspeople, investors, and experts in their field who offer advice, feedback, and access to professional networks (Politis, 2005; Cohen, 2006). Collaborative projects, discussion forums, and reflective journals help students learn from each other by encouraging social presence and collective intelligence (Garrison et al., 2000; Wenninger, 2020).

Structured mentoring programs are more satisfying and lead to better business outcomes than unstructured or ad hoc methods, according to research (Eby et al., 2008). Mentoring is built into the VEHUB4YOU curriculum through regular check-ins, group coaching sessions, and chances for alumni to get involved.

In virtual entrepreneurship education, testing is moving away from traditional tests and toward performance-based, formative, and reflective methods (Wenninger,

2020; Gangi & Sirelkatim, 2023). Portfolios, business plan presentations, peer reviews, and self-assessment tools are becoming increasingly common ways to thedemonstrate how diverse range of skills an entrepreneur needs (Hahn et al., 2017). Digital platforms make it possible to get feedback and analyze data in real time, which helps with adaptive learning pathways and ongoing improvement (Pane et al., 2017).

VEHUB4YOU uses a multi-layered assessment strategy that includes formative feedback, summative evaluation, and tracking entrepreneurial outcomes over time. This method not only helps students learn, but it also gives useful information for improving the curriculum and measuring its effects (VEHUB4YOU Consortium, 2024).

Table 3.1 gives a clear picture of the teaching methods used in virtual business hubs. It lists the main ones talked about in this section, along with their main features, strengths, and common uses in entrepreneurship education.

This synthesis makes it easier to compare and helps curriculum designers choose and combine the best strategies for different types of learning situations.

While the literature and project experience converge on the value of experiential, competence-based, and digitally integrated curricula, challenges remain. These include ensuring inclusivity for learners with varying digital skills, contextualizing content for different cultural and economic environments, and maintaining engagement in asynchronous settings (Lackéus, 2015; Motta & Ribeiro, 2023). Future research and practice should focus on the development of adaptive curricula, the integration of emerging technologies (such as AI-driven learning analytics), and the scaling of best practices across regions.

Everyone agrees that human facilitation and mentoring are key to the success of virtual business hubs. They are what connect technology, curriculum, and the learner's experience (St-Jean & Audet, 2012; Rae, 2007; Eby et al., 2008). However, a close look at these factors shows that they are necessary, but putting them into practice in digital settings is full of problems that could limit their ability to change things if they are not dealt with in a systematic way.

Table 3.1. Summary of Main Didactic Approaches in Virtual Business Hubs. Authors' elaboration.

Approach	Key Features	Strengths	Typical Applications	References
Experiential Learning	Learning by doing, reflection, iterative cycles	Develops practical skills, resilience, mindset	Business simulations, real projects	Kolb (1984); Lackéus (2015)
Project-Based Learning	Team projects, authentic tasks, interdisciplinary work	Fosters collaboration, problem-solving	Start-up labs, business plan contests	Musteen et al. (2018); Hahn et al. (2017)
Problem-Based Learning	Real-world problems, student-driven inquiry	Enhances critical thinking, adaptability	Venture challenges, case studies	Barrows (1996); Hmelo-Silver (2004)
Simulation-Based Learning	Virtual scenarios, risk-free experimentation	Safe failure, strategic decision-making	Virtual startups, market simulations	Nabi et al. (2017); Pane et al. (2017)
Mentoring & Coaching	Guidance from experts, feedback, role modeling	Personalized support, network building	Mentor programs, coaching sessions	St-Jean & Audet (2012); Eby et al. (2008)
Peer-to-Peer Learning	Collaborative learning, peer feedback	Builds community, social presence	Group reflection, peer review	Garrison et al. (2000); Wenninger (2020)
Digital/Blended Learning	Integration of online tools and face-to-face methods	Flexibility, scalability, digital literacy	Online modules, hybrid courses	Jardim (2021); Coates (2014)

Mentoring and facilitation are clearly helpful: structured programs lead to better business outcomes, happier participants, and faster growth of both hard and soft skills (Myue, 2024; Politis, 2005). Mentors help mentees navigate uncertainty and build confidence by providing them with advice, feedback, and access to professional networks (St-Jean & Audet, 2012). Facilitators, on the other hand, are very important for creating teaching presence and social presence (Garrison et al., 2000). They help the group stick together, moderate discussions, and show how to act like an entrepreneur.

Yet, the literature highlights several critical challenges:

- Student Engagement and Motivation: Engagement in virtual mentoring is complex and not guaranteed by the presence of digital tools or structured programs. Many students remain passive or detached, with engagement strongly influenced by motives of belonging, competence, and autonomy, which vary widely (Knox, 2022; Fitzgerald, 2020). The lack of face-to-face interaction can lead to feelings of isolation, reduced motivation, and lower participation, especially among less self-directed learners (Morris & Liguori, 2016; Perets et al., 2020).

- Adaptation and Institutional Barriers: Both students and educators face adaptation challenges when shifting to facilitation- and mentoring-based models. There may be resistance to change, especially from faculty accustomed to traditional didactic roles, and from students unfamiliar with self-directed, inquiry-based learning (Motta & Galina, 2023; Bell & Bell, 2018). Institutions often lack the resources, professional development programs, and organizational flexibility needed to support high-quality mentoring at scale (Malik-Kozlowska & Kozlowski, 2025).

- Quality and Consistency of Mentoring: The effectiveness of mentoring depends heavily on the passion, flexibility, and expertise of mentors (Mandel & Noyes, 2016)2. Remote mentoring, in particular, presents challenges such as participant responsiveness, time commitment, and the risk of superficial engagement. While structured programs yield better outcomes, they require careful design, ongoing support, and robust matching mechanisms to align mentor expertise with mentee needs (Eby et al., 2008; Cohen, 2006).

- Assessment and Feedback: Assessing the impact of facilitation and mentoring on entrepreneurial competence remains a challenge. Innovative assessment methods such as portfolios and peer review are promising, but their implementation is resource-intensive and requires clear criteria and institutional support (Wenninger, 2020; Gangi & Sirelkatim, 2023). There is also the risk that assessment focuses too narrowly on measurable outcomes, neglecting the development of soft skills and metacognitive abilities (Simmons, 2021).

- Cultural and Linguistic Diversity: In international and multicultural hubs, facilitators and mentors must possess high cultural intelligence (CQ) to navigate linguistic, normative, and epistemic diversity (Ang & Van Dyne, 2015; Earley & Ang, 2003; Rockstuhl et al., 2011). Training in CQ is often lacking, and without it, there is a risk of miscommunication, exclusion, or underutilization of the potential for innovation that diversity offers (Bennett, 1993).

The VEHUB4YOU project has dealt with some of these problems by including structured mentoring, regular feedback loops, and a variety of ways for students to get involved (one-on-one, in groups, and with peers). However, project data show that keeping high levels of engagement and quality across different cultural and institutional settings requires ongoing investment in mentor training, digital facilitation skills, and adaptive program design (VEHUB4YOU Consortium, 2024).

In conclusion, human facilitation and mentoring are essential for the success of virtual business hubs, but they only work if the program is well-designed, the institution is committed, and the needs of learners and mentors are always changing. Future research and practice should focus on hybrid models that combine digital and in-person elements, better training for mentors (especially in cultural intelligence), and the creation of strong, multidimensional assessment frameworks.

The quality, depth, and openness of the community dynamics are what make virtual business hubs work. In digital entrepreneurial ecosystems, the community is not just a side note; it is the glue that holds together innovation, knowledge sharing, and long-term involvement (Putnam, 2000; Garrison et al., 2000; Wang et al., 2021). Virtual hubs need to be designed with social capital, trust, and cultural intelligence in mind, unlike traditional physical incubators. This is because being physically distant makes it easier for people to feel alone, fragmented, and disengaged (Berry, 2019; McNeil et al., 2000).

The theory of social capital gives us a strong way to explain why some virtual hubs do well and others do poorly. Social capital is the resources that social networks have, like trust, shared norms, and reciprocity. It helps people share information, get

emotional support, and find business opportunities (Putnam, 2000; Wang et al., 2021). Both bonding social capital (strong ties within a group) and bridging social capital (weak ties between different groups) are very important in virtual settings. Bonding capital helps people feel safe and supported, which are important for taking risks and learning from mistakes (Li et al., 2021). Bridging capital, on the other hand, leads to new ideas, markets, and partnerships, which encourages innovation and cross-pollination (Herrero, 2018).

Research shows that online hubs with more social capital have more entrepreneurs, are more resilient, and can adapt to change, especially during times of uncertainty or crisis (Kobayashi et al., 2006; Wang et al., 2021). But it's not automatic to build and keep social capital in virtual spaces. It takes careful planning, skilled facilitation, and ongoing investment in activities that bring people together (Berry, 2019; McNeil et al., 2000).

Effective virtual business hubs employ a range of community-building strategies to foster engagement and a sense of belonging. These include:

- thematic discussion forums and interest-based groups, which create spaces for peer-to-peer learning and support (Garrison et al., 2000);

- structured peer feedback and collaborative projects, which not only enhance learning but also build trust and shared identity (Berry, 2019);

- virtual networking events and informal meetups, which replicate the serendipity of in-person encounters and help participants expand their professional networks (VEHUB4YOU Consortium, 2024).

The VEHUB4YOU project has demonstrated that these strategies, when systematically implemented, lead to higher engagement, lower dropout rates, and stronger entrepreneurial intentions among participants. Notably, hubs that invest in regular community rituals - such as welcome sessions, milestone celebrations, and alumni events - report greater cohesion and long-term network effects (VEHUB4YOU Consortium, 2024).

Cultural competence is not just a nice to have in international and multicultural virtual hubs; it is a strategic need. Cultural intelligence (CQ) is the ability to work well in places where people come from different cultures. It includes cognitive, motivational, and behavioral aspects (Earley & Ang, 2003; Ang & Van Dyne, 2015). People with high CQ can understand new cues, change how they communicate, and build trust across language and cultural barriers (Rockstuhl et al., 2011; Ang & Inkpen, 2008).

According to the research, teams with high average CQ are more creative, have fewer problems, and work better together online (Ambrose et al., 2009; da-ra.de, 2018). On the other hand, not being culturally competent can cause misunderstandings, exclusion, and not using the creative potential that comes with diversity (Bennett, 1993).

Because of this, the best virtual hubs, like VEHUB4YOU, include CQ training in their programs. They do this through workshops, reflective exercises, and intercultural dialogue to get people ready to work together across cultures (VEHUB4YOU Consortium, 2024). Such training has been shown to boost empathy, cut down on stereotypes, and open up new ways of innovating that only happen when people from different backgrounds are fully involved (Ang & Van Dyne, 2015; Berry, 2019).

Even with these improvements, there are still big problems. Building community in virtual spaces takes a lot of time and resources, and participants may get Zoom fatigue, have trouble making deep connections, or stop participating because of other commitments (Berry, 2019; Perets et al., 2020). There can still be cultural misunderstandings, especially when people have very different levels of language and digital literacy (Ambrose et al., 2009; Malik-Kozlowska & Kozlowski, 2025). Also, the risk of echo chambers or the dominance of certain cultural or linguistic groups can make it harder for everyone to be included and stop new ideas from coming up (Bennett, 1993; Wang et al., 2021).

To address these challenges, best practices include:

- intentional community design, with clear norms, roles, and rituals that foster inclusion and psychological safety;

- continuous facilitation by culturally intelligent moderators who can bridge divides and mediate conflicts;

- regular assessment of community health, using surveys and analytics to identify and address emerging issues.

Ultimately, the strength of community dynamics and cultural competence determines not only immediate engagement but also the long-term sustainability and impact of virtual business hubs. A vibrant, inclusive community multiplies the value of technology and pedagogy, enabling participants to access new opportunities, co-create knowledge, and build entrepreneurial identities that persist beyond the duration of any single program (Putnam, 2000; VEHUB4YOU Consortium, 2024).

In the context of VEHUB4YOU, these dimensions have been critical for scaling the model across Italy, Ukraine, Azerbaijan, and Latvia - demonstrating that investing in social capital and cultural intelligence is not an ancillary activity, but a strategic imperative for the future of digital entrepreneurship education.

The long-term success and trustworthiness of virtual business hubs depend not only on how well they use technology and teach, but also on how well they are run, how long their resource models last, and how strict their systems for measuring impact are. These dimensions aren't just administrative details; they're the strategic backbone that decides if a hub can adapt, grow, and create lasting value in a quickly changing world of education and business (Bryson, Crosby & Stone, 2006; Bugg-Levine & Emerson, 2011).

Strong governance is the invisible hand that brings together the interests of different stakeholders, holds people accountable, and lets organizations quickly adapt to new situations. When it comes to virtual business hubs, good governance means bringing together the views of many different stakeholders, such as educators, entrepreneurs, policymakers, funders, and community representatives, through open and participatory structures (Bryson, Crosby & Stone, 2006). The literature shows that

public-private partnerships and multi-stakeholder steering committees are not only best practices, but also necessary for legitimacy, responsiveness, and operational agility (Romero, Ortiz & Molina, 2010).

But there are still big problems that need to be solved. If inclusivity isn't balanced with clear leadership and efficient processes, open governance models can lead to bureaucratic inertia or decision paralysis. There is also the ongoing risk of tokenism, in which stakeholder voices are formally included but not really given power (Bryson, Crosby, & Stone, 2006). The VEHUB4YOU experience shows that governance can only be a real driver of innovation and regional alignment when local institutions, youth, and business leaders work together to make rules and set priorities (VEHUB4YOU Consortium, 2024).

Many virtual hubs struggle with financial sustainability, especially in areas where it is hard to get stable public funding or philanthropic capital. The international literature and development experience say that blended finance models, which mix grants, service fees, and social impact investments, are necessary for resilience (Bugg-Levine & Emerson, 2011; IFC, 2025). These kinds of models lower the risk of losing money, make it possible to plan for the long term, and get businesses involved, but they are not a cure-all.

The International Finance Corporation (IFC, 2025) says that blended finance should be used with caution because poorly designed models can change markets, make people dependent, or move priorities away from the hub's main goal. One important strategy is to diversify your income through local sponsorships, alumni networks, or social enterprise activities. However, this requires entrepreneurial skills and the ability to adapt over time. The VEHUB4YOU pilots show that hubs that use more than one funding source are more stable and can invest in new ideas. However, they also have to deal with more complicated resource management and reporting (VEHUB4YOU Consortium, 2024).

Not only is rigorous impact measurement requireded a reporting requirement, it is also a strategic tool for continuous improvement, legitimacy, and scaling (OECD, 2019; Kirkpatrick & Kirkpatrick, 2006). The MEL cycle, which stands for Monitoring,

Evaluation, and Learning, should be a part of the whole project lifecycle, from the first needs assessment to the last evaluation and knowledge transfer (Globalschoolsforum.org, 2023).

Monitoring means collecting data on a regular basis to see how things are going and let people know about problems right away. Evaluation gives a structured look at key points along the way and at the end of the project, answering questions about how well it worked, how efficiently it worked, and what effect it had. Learning is the act of thinking about information and experiences in order to make changes and come up with new ideas (Globalschoolsforum.org, 2023; Resonanceglobal.com, 2024).

A MEL Framework is a systematic approach to tracking a project's progress (Monitoring), understanding its impact (Evaluation), and using those insights to improve your implementation and future initiatives (Learning) (Globalschoolsforum.org, 2023).

According to the OECD (2019) and Kirkpatrick & Kirkpatrick (2006), the best MEL systems use both quantitative and qualitative indicators, use both formative and summative approaches, and get input from stakeholders on what success looks like. But there are risks: focusing too much on easily measurable outputs can hide deeper social and cultural outcomes, and if people don't have the time or money to participate, MEL processes can become shallow or just a way to check off boxes.

Figure 3.2 shows that MEL is a never-ending, iterative process that links needs assessment, planning, monitoring, evaluation, reflection, and adaptation. All stakeholders should be involved in defining, measuring, and learning from impact at all stages of the project lifecycle in order to have effective MEL systems.

The VEHUB4YOU experience shows that hubs with integrated governance, a variety of funding sources, and strong MEL frameworks have higher completion rates, better self-efficacy as entrepreneurs, and more new businesses created by participants. But there are a lot of trade-offs along the way: inclusivity has to be balanced with efficiency, financial diversification with mission integrity, and data-driven accountability with respect for outcomes that are specific to the situation.

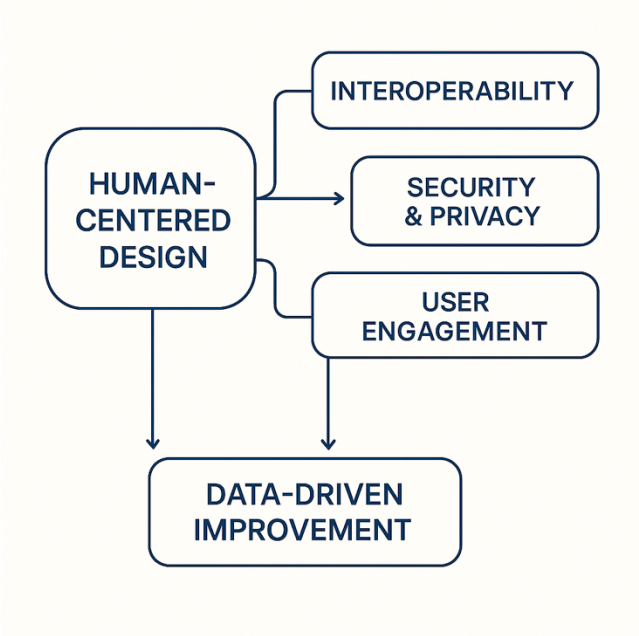

Fig. 3.2. The Monitoring, Evaluation, and Learning (MEL) Cycle in Virtual Business Hubs. Authors' elaboration

So, for virtual business hubs that want to be both innovative and long-lasting in a complicated, globalized world, a critical, flexible approach to governance, sustainability, and measuring impact is not an option; it is a must.

The integration of multiple theoretical perspectives and empirical insights is increasingly recognized as a critical success factor for the design, implementation, and evaluation of virtual business hubs. Recent scholarship on entrepreneurial ecosystems highlights that the complexity and dynamism of these environments demand frameworks that can bridge technological, organizational, and social dimensions, while remaining sensitive to local context and digital transformation (Autio & Cao, 2025; Carvalho et al., 2022; ElgarOnline, 2024).

Entrepreneurial ecosystems are no longer understood as static, regionally bounded clusters, but as dynamic, digitally mediated networks characterized by fluid boundaries, knowledge spillovers, and multi-level interactions (Autio & Cao, 2025; Stam & Spigel, 2016). Contemporary integrative frameworks, such as those proposed by Autio and Cao (2025), combine the ecosystem community (including community richness and cohesion), resource dynamics, knowledge spill-over dynamics, and

general framework conditions. This approach is echoed in the digital entrepreneurial ecosystem literature, which stresses the interplay between spatial and digital affordances, the role of shared experiential knowledge, and the importance of both formal and informal institutional arrangements (ElgarOnline, 2024; Carvalho et al., 2022).

A key insight from this body of work is the need for horizontal integration - linking actors, resources, and support mechanisms across different stages and domains - and vertical integration, which connects micro-level entrepreneurial activities with macro-level policies and infrastructure (Autio & Cao, 2025). This multi-level, integrative perspective is essential for capturing the emergent properties of digital ecosystems, such as adaptability, resilience, and knowledge co-creation (Carvalho et al., 2022; Luik et al., 2019).

Empirical studies of virtual hubs confirm that successful initiatives are those that operationalize integrative frameworks, ensuring alignment between strategic vision, technological infrastructure, curriculum, mentoring, community engagement, and governance (Luik et al., 2019; VEHUB4YOU Consortium, 2024). For example, Luik et al. (2019) document how leading virtual hubs systematically combine social capital development, knowledge exchange, and incubation support, using both customized and off-the-shelf digital tools to facilitate multi-directional flows of information and support.

The VEHUB4YOU project offers a compelling case of integrative practice. Its model explicitly maps the core elements of entrepreneurial ecosystems - leadership, technology, community, mentoring, and impact measurement - onto the corresponding presences of online learning theory (Garrison, Anderson & Archer, 2000; Stam & Spigel, 2016). This mapping is not merely conceptual: it guides the design of activities, the allocation of resources, and the continuous adaptation of the hub’s operations.

This integrative approach is supported by empirical evidence from the VEHUB4YOU pilots: hubs that systematically addressed all five dimensions achieved a 75% completion rate, a 35% improvement in entrepreneurial self-efficacy, and a 28%

higher rate of new venture creation within six months after program completion, compared to hubs lacking integrated designs (VEHUB4YOU Consortium, 2024).

Table 3.2. Integrative framework mapping entrepreneurial ecosystem elements to online learning presences, illustrating how theoretical constructs inform practical design in virtual business hubs. Authors' elaboration.

Ecosystem Element	Online Learning Presence	Practical Design Implication
Leadership & Strategy	Teaching presence	Clear vision, active facilitation
Technology	Cognitive presence	Scalable, accessible, data-driven platforms
Community	Social presence	Forums, peer feedback, networking events
Mentoring/Networks	Teaching/social presence	Structured mentorship, alumni engagement
Assessment/Impact	Cognitive presence	Data analytics, MEL systems, continuous feedback

Despite the promise of integrative frameworks, several challenges persist. First, there is a risk of conceptual overload when too many models are layered without clear operationalization or adaptation to local context (Carvalho et al., 2022). Second, while integration fosters synergy, it can also create tensions between standardization and flexibility, especially in multicultural or rapidly changing environments (ElgarOnline, 2024; Luik et al., 2019). Third, empirical studies caution that integration must be dynamic and iterative: frameworks should be treated as living tools, continuously refined through stakeholder feedback and real-world data (Autio & Cao, 2025; VEHUB4YOU Consortium, 2024).

Finally, the literature increasingly calls for cross-contextual validation of integrative models, recognizing that what works in one region or sector may require significant adaptation elsewhere (Carvalho et al., 2022). The VEHUB4YOU experience, spanning Italy, Ukraine, Azerbaijan, and Latvia, demonstrates that successful integration depends on both rigorous theoretical grounding and flexible, context-sensitive implementation.

In summary, the most resilient and impactful virtual business hubs are those that use integrative frameworks as dynamic scaffolds - guiding design, evaluation, and adaptation - while remaining open to ongoing learning and contextual evolution.

The comprehensive analysis presented in this chapter demonstrates that the success of Virtual Youth Business Hubs is contingent upon the systematic integration of technological, pedagogical, human, community, and governance dimensions. Each factor, while individually necessary, achieves its full transformative potential only when embedded in a coherent, adaptive ecosystem that is both evidence-based and context-sensitive (Stam & Spigel, 2016; Garrison et al., 2000; VEHUB4YOU Consortium, 2024).

First, the establishment of a robust and inclusive technological infrastructure is not merely a technical requirement, but a strategic enabler of scalability, accessibility, and digital equity (Sun & Chen, 2016; Norman, 2013). Platforms designed according to human-centered and interoperable principles foster engagement, facilitate personalized learning, and support the seamless integration of advanced pedagogical tools (Coates, 2014; Armbrust et al., 2010).

Second, curriculum design rooted in experiential, project-based, and problem-based learning - anchored by frameworks such as EntreComp - ensures that entrepreneurial competencies are developed in authentic, action-oriented contexts (European Commission, 2018; Kolb, 1984; Nabi et al., 2017). The alignment of learning objectives, assessment strategies, and digital tools with real-world entrepreneurial challenges is essential for fostering self-efficacy, creativity, and resilience (Cascavilla et al., 2022; Hahn et al., 2017).

Third, human facilitation and structured mentoring serve as the connective tissue between technology and pedagogy, providing individualized guidance, social presence, and professional networks that are indispensable for entrepreneurial learning and venture creation (St-Jean & Audet, 2012; Politis, 2005; Rae, 2007). The empirical evidence underscores that structured mentoring networks, regular feedback, and culturally intelligent facilitation significantly improve participant outcomes (Eby et al., 2008; Ang & Van Dyne, 2015).

Fourth, community dynamics and cultural competence are not peripheral, but central to the sustainability and impact of virtual hubs. High levels of social capital, trust, and cultural intelligence (CQ) foster knowledge exchange, innovation, and resilience, while mitigating the risks of isolation, disengagement, and cultural misunderstanding (Putnam, 2000; Berry, 2019; Earley & Ang, 2003).

Fifth, effective governance, diversified and sustainable funding, and rigorous impact measurement (MEL) are foundational for long-term resilience and scalability (Bryson et al., 2006; Bugg-Levine & Emerson, 2011; OECD, 2019). Multi-stakeholder governance models, blended finance, and data-driven MEL systems ensure accountability, adaptability, and continuous improvement (Kirkpatrick & Kirkpatrick, 2006; IFC, 2025).

Finally, the use of integrative frameworks - mapping entrepreneurial ecosystem elements to online learning presences - enables practitioners to bridge theory and practice, diagnose system gaps, and design adaptive interventions (Garrison et al., 2000; Stam & Spigel, 2016; Luik et al., 2019). The empirical results from the VEHUB4YOU pilots confirm that hubs adopting such integrative approaches achieve higher completion rates, greater entrepreneurial self-efficacy, and increased venture creation (VEHUB4YOU Consortium, 2024).

Recommendations for Future Practice and Policy:

1. Adopt a holistic, systems-based approach to hub design, ensuring the deliberate integration of technology, pedagogy, mentoring, community, and governance (Autio & Cao, 2025; Carvalho et al., 2022).

2. Prioritize accessibility and digital inclusion through human-centered design, continuous digital skills training, and technical support (Norman, 2013; Sun & Chen, 2016).

3. Institutionalize experiential and action-based learning using frameworks such as EntreComp and Kolb’s experiential cycle, with assessment strategies aligned to real entrepreneurial outcomes (European Commission, 2018; Kolb, 1984).

4. Invest in structured mentoring and facilitator training, with a focus on cultural intelligence and adaptive peer learning models (St-Jean & Audet, 2012; Ang & Van Dyne, 2015).

5. Cultivate vibrant, inclusive communities through intentional community-building, peer feedback, and cultural competence training (Berry, 2019; Putnam, 2000).

6. Secure sustainable, diversified funding and establish transparent, participatory governance structures (Bryson et al., 2006; Bugg-Levine & Emerson, 2011).

7. Embed rigorous MEL systems that combine quantitative and qualitative indicators, support continuous improvement, and inform strategic adaptation (OECD, 2019; Kirkpatrick & Kirkpatrick, 2006).

8. Promote cross-contextual adaptation and learning, using pilot data and stakeholder feedback to refine models and support international transferability (Carvalho et al., 2022; VEHUB4YOU Consortium, 2024).

The future of entrepreneurial education in virtual environments will be shaped by those able to orchestrate integration, foster inclusion, and institutionalize adaptive learning. The VEHUB4YOU experience demonstrates that investing in people, communities, and systems - beyond technology alone - is essential for building resilient, innovative ecosystems that can thrive in complexity and drive sustainable impact.

3.3. Problems and solutions of virtual education

Since the second decade of the 21st century, the processes of globalization and digitalization have significantly transformed all spheres of society, including the education system, affecting its functional and structural foundations (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022). In this context, the concept of virtual education emerges not merely as an alternative model but as a platform developing alongside traditional education systems, often complementing them (Zhao, 2020; Roschelle, Lester, & Fusco, 2020). The COVID-19 pandemic accelerated this process

and compelled education systems worldwide to reassess their strengths and weaknesses, infrastructural preparedness, pedagogical approaches, and digital competencies (Zhao, 2020; Alamri, Lowell, Watson, & Watson, 2020).

Virtual education has now become an integral component of modern pedagogical training and scientific research activities (Gutiérrez & Beatriz, 2017; Ziker, Truman, & Dodds, 2021). Its implementation and development are not solely linked to technological progress but are also closely intertwined with social, psychological, and legal contexts (Hasan, Noor, Rahman, & Rahman, 2020). Reports by prominent international organizations such as UNESCO and OECD highlight the digitalization of education as an inevitable and continuous trend (UNESCO-IBE, 2023). Consequently, there is a growing necessity to redesign the content, form, and objectives of the educational process. Within the virtual education model, fundamental aspects such as educational relationships, teaching methods, assessment criteria, and learning motivation must be addressed through new approaches (Mustafayeva, Aliyeva, & Israfilova, 2023; Mustafayeva, Zeynalov, Bakhshiyeva, & Nasirova, 2023).

The primary aim of this study is to conduct a comprehensive and systematic investigation of the main challenges faced by virtual education within the framework of contemporary demands and challenges, to analyze the causes of these problems on a scientific basis, and to propose targeted strategies for their resolution (Mustafayeva, Nasirov, & Ahmadov, 2024). The research involves an in-depth analysis of international experiences (with a focus on leading countries such as the United States, Finland, and South Korea) and applies a comparative approach to examine the relevance and applicability of these experiences to the Azerbaijani context (Coursera, n.d.; edX, n.d.; Khan Academy, n.d.; Duolingo, n.d.; Saylor Academy, n.d.). This methodological approach aims to objectively identify existing differences, similarities, and potential opportunities.

Research findings indicate that virtual education should not be viewed merely as a temporary mechanism to be employed in emergency situations - such as during the COVID-19 pandemic - but rather as a structured, flexible, and inclusive model of next-generation education (Zhao, 2020; Roschelle, Lester, & Fusco, 2020). The sustainable

implementation of this model is expected to play a crucial role in shaping knowledge societies, enhancing digital literacy, and fostering the development of intellectual capital (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022). In the information age, societal development is increasingly measured not only by material resources but also by the ability to create, assimilate, and disseminate information. In this regard, virtual education offers unparalleled opportunities for the democratization of education and the expansion of individualized learning pathways (UNESCO-IBE, 2023).

The scientific novelty of this study lies in the fact that it does not merely describe the current situation but also advances concrete policy recommendations and strategic approaches based on contextual analyses and empirical data (Mustafayeva, Nasirov, & Ahmadov, 2024). Such an approach provides significant scientific and practical contributions both to the improvement of national education strategies and to the development of a more competitive Azerbaijani presence within the global education system (Mustafayeva, Aliyeva, & Israfilova, 2023; Mustafayeva, Zeynalov, Bakhshiyeva, & Nasirova, 2023).

The relevance of virtual education in the contemporary era is driven by several key factors. First, the rapid development of information and communication technologies (ICT) and their integration into the education system have laid the groundwork for the formation of new learning models (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022). Unlike traditional classroom-based education, virtual education offers learners the opportunity to study independently of time and space constraints, which proved to be one of the main factors ensuring the continuity of education during the pandemic (Zhao, 2020; Roschelle, Lester, & Fusco, 2020).

Second, the core components affecting the quality of education - teacher preparation, infrastructure, assessment systems, and student motivation - have faced unique challenges within virtual environments (Mustafayeva, Aliyeva, & Israfilova, 2023; Mustafayeva, Zeynalov, Bakhshiyeva, & Nasirova, 2023). International experience demonstrates that a successful virtual education system requires long-term strategic planning, the development of a robust technological infrastructure, and the continuous improvement of human resources (Alamri, Lowell, Watson, & Watson,

2020; Gutiérrez & Beatriz, 2017). However, in Azerbaijan, progress in this area was largely driven by emergency measures during the pandemic, while structured and sustainable strategies are only beginning to take shape (Mustafayeva, Nasirov, & Ahmadov, 2024).

Third, digital inequality between regions, disparities in digital skills among teachers and students, the lack of objectivity in assessment processes, and the incomplete legal and regulatory framework remain the main obstacles to the effective implementation of virtual education (Hasan, Noor, Rahman, & Rahman, 2020; UNESCO-IBE, 2023). Addressing these challenges demands a comprehensive approach, not only from a technical perspective but also through pedagogical, psychological, and administrative interventions (Mustafayeva & Bakhshiyeva, 2022; Ziker, Truman, & Dodds, 2021).

The relevance of the topic is further underscored by the fact that in the future, a country's level of development within the information society will not be measured solely by the availability of technological resources but also by the quality of intellectual capital cultivated within digital education environments (Mustafayeva, 2021; Zhao, 2020). This necessitates an in-depth scientific analysis of issues such as the effective transmission of knowledge in virtual settings, the preservation of socio-emotional learning, and the establishment of fair assessment systems (Roschelle, Lester, & Fusco, 2020; Mustafayeva, Nasirov, & Ahmadov, 2024).

Consequently, the investigation of existing problems in virtual education and the proposal of efficient solutions are essential not only for the resilience of the education system but also for the successful realization of national development strategies (Mustafayeva, Aliyeva, & Israfilova, 2023; Mustafayeva, Zeynalov, Bakhshiyeva, & Nasirova, 2023). In this regard, the research topic stands out due to its topicality and strategic significance.

The penetration of information technologies into the education system has led not merely to the emergence of alternative methods but to the transformation of entire educational models (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022; Mustafayeva, Aliyeva, & Israfilova, 2023; Mustafayeva, Zeynalov, Bakhshiyeva, &

Nasirova, 2023; Mustafayeva, Nasirov, & Ahmadov, 2024). The rapid transition experienced during the pandemic period turned the concept of virtual education into a central component in many countries, including Azerbaijan. However, this transition often occurred without systematic strategic planning or pedagogical transformation, leading to the emergence of several pressing issues:

- Technological disparities within the educational environment;
- Weaknesses in the provision of content and methodological support for virtual instruction;
- Insufficient digital competencies among teachers and students;
- Lack of reliability in assessment and outcome-based approaches.

These challenges are not unique to Azerbaijan. Similar issues have been observed in many other countries as well (Zhao, 2020; Roschelle, Lester, & Fusco, 2020). However, in developed nations, the process has been managed in a more flexible and adaptive manner. The main reasons behind these differences are presented comparatively in Table 3.3.

Table 3.3. Comparative Analysis of International Practice and Azerbaijan's Current Situation

Analysis Aspect	**International Practice (USA, Finland, South Korea)**	**Azerbaijan's Experience**
Strategic Approach	Virtual education is integrated into national education strategy with long-term planning.	Implemented urgently due to the pandemic; structured strategy is being forming newly.
Infrastructure	Widespread use of digital platforms, LMS (Moodle, Kahoot, Canvas), VR/AR.	LMS exists in some universities, but most rely on Zoom, MS Teams, KOICA, WhatsApp, and email.
Teacher Training	Ongoing programs in digital pedagogy and tech skills.	Such programs have only recently started and are not yet widespread.
Assessment Systems	Use of proctoring technologies and AI-based assessment tools.	Assessment is often formal and lacks robust technological support.
Student Participation & Motivation	Gamification, interactive content, and project-based learning are widely used.	Low motivation and passive participation are common.
Equity in Access to Education	Technical support and state subsidies for disadvantaged students.	Serious issues with internet access and devices, especially in regions.

As shown in the table, there are several significant distinctions between international practices and Azerbaijan's current situation regarding the organization of virtual education.

These differences primarily manifest in aspects such as strategic approaches, infrastructure, teacher training, assessment systems, student engagement and motivation, as well as equitable access to education (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022; Mustafayeva, Aliyeva, & Israfilova, 2023).

In developed countries, including the United States, Finland, and South Korea, virtual education has become an integral part of national education strategies. In these countries, virtual education is implemented through long-term planning and systematic approaches (Alamri, Lowell, Watson, & Watson, 2020; Roschelle, Lester, & Fusco, 2020). In Azerbaijan, however, virtual education was introduced rapidly during the pandemic as an urgent necessity, and structured, sustainable strategies in this area are still in the early stages of development (Mustafayeva, Nasirov, & Ahmadov, 2024).

In terms of infrastructure, international practice demonstrates the widespread use of essential technological tools for digital education - such as Learning Management Systems (LMS) like Moodle, Kahoot, and Canvas, as well as VR (Virtual Reality) and AR (Augmented Reality) technologies (Ziker, Truman, & Dodds, 2021; Gutiérrez & Beatriz, 2017). Although LMS systems have been implemented in some higher education institutions in Azerbaijan, in most cases, platforms such as Zoom, Microsoft Teams, the KOICA platform, WhatsApp, and email are predominantly used, which inevitably affects the overall quality of education (Mustafayeva & Bakhshiyeva, 2022; Hasan, Noor, Rahman, & Rahman, 2020).

Significant differences are also evident in the area of teacher preparation. In international practice, continuous training programs focused on digital pedagogy and technological competencies are regularly conducted for educators (Alamri et al., 2020; Ziker et al., 2021). Although similar programs have been initiated in Azerbaijan, their reach remains limited, and their development is still at an initial stage (Mustafayeva, Aliyeva, & Israfilova, 2023).

Differences are also apparent in the organization of assessment systems. In developed countries, technologies such as proctoring systems and AI-based assessment tools are widely used, ensuring greater transparency and objectivity (Hasan et al., 2020; Roschelle et al., 2020). In Azerbaijan, however, assessment often retains a formal character, and the lack of robust technological infrastructure diminishes the effectiveness of the evaluation process (Mustafayeva, Nasirov, & Ahmadov, 2024).

In terms of student participation and motivation, international practice ensures a high level of engagement through gamification, interactive content, and project-based learning methods (Alamri et al., 2020; Gutiérrez & Beatriz, 2017). In Azerbaijan, however, motivation levels remain low, and the issue of passive participation is widespread (Mustafayeva & Bakhshiyeva, 2022).

Regarding equitable access to education, developed countries offer technical support and state subsidies for students in need (Zhao, 2020; UNESCO-IBE, 2023). In Azerbaijan, particularly in regional areas, the lack of internet access and technological resources remains one of the main barriers limiting access to education (Mustafayeva et al., 2023).

Overall, it is crucial for Azerbaijan to learn from international best practices and ensure the development of the virtual education sector through adapted and sustainable strategies. This requires the consistent and systematic implementation of measures aimed at improving infrastructure, training pedagogical staff, and increasing student motivation (Mustafayeva, 2021; Roschelle et al., 2020).

As the comparative analysis above demonstrates, the development of virtual education depends not merely on the availability of technological infrastructure but, more importantly, on a fundamental shift in educational philosophy (Mustafayeva et al., 2023; Zhao, 2020). The key to success lies not simply in the adoption of technology, but in its purposeful and pedagogically grounded application.

In the Azerbaijani context, the problem can be structured around the following core components (Mustafayeva & Bakhshiyeva, 2022; Mustafayeva et al., 2024):

- Regional disparities in technical infrastructure – Issues regarding internet access, computers, servers, and software persist, especially in rural schools and regional universities.
- Insufficient digital readiness of human resources – Digital competencies among teachers and administrators are not yet fully developed.
- Weakness of the pedagogical model – Traditional teaching methods have not been adequately adapted to the virtual learning environment; interactive and student-centered teaching approaches are rarely employed.
- Socio-cultural attitudes towards virtual education – Among some parents and even educators, virtual education is not perceived as a legitimate substitute for real education.
- Deficiencies in normative and legal frameworks – Issues such as copyright in online education, the legal basis for assessment, and the recognition of diplomas remain unclear.

The challenges facing virtual education must become not only a matter of practical concern but also a subject of rigorous scientific and pedagogical research (Mustafayeva et al., 2023; Ziker et al., 2021). A comprehensive approach, drawing on contemporary pedagogy, educational technology, curriculum theory, and social psychology, is necessary to address these challenges effectively (Mustafayeva et al., 2024; Hasan et al., 2020).

Thus, the central problem of research and reform in this field can be formulated as follows:

There is a need for the integrated development of technical, pedagogical, institutional, and socio-cultural components to enable the systematic organization of virtual education within Azerbaijan's national education system.

Addressing this problem requires not only the provision of technology but also the restructuring of educational content, the transformation of teachers' roles, and the establishment of a digital paradigm in education management (Mustafayeva, 2021; Mustafayeva et al., 2023).

Addressing the current challenges of virtual education requires a set of fundamental and systematic approaches. Foremost among these is the need to restructure teaching methodologies and advance digital pedagogy (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022; Mustafayeva, Aliyeva, & Israfilova, 2023; Mustafayeva, Zeynalov, Bakhshiyeva, & Nasirova, 2023; Mustafayeva, Nasirov, & Ahmadov, 2024; Alamri, Lowell, Watson, & Watson, 2020; Roschelle, Lester, & Fusco, 2020; Zhao, 2020; Ziker, Truman, & Dodds, 2021; Hasan, Noor, Rahman, & Rahman, 2020; Gutiérrez & Beatriz, 2017). This transformation should not be limited to the mere implementation of technology but must also encompass a broader shift in educational philosophy. In this regard, key initiatives such as the *State Strategy for the Development of Education in the Republic of Azerbaijan* (2013), the *Digital Skills* project, and the *Digital Transformation Strategy for 2022–2026* play a crucial role (Republic of Azerbaijan, 2013; Republic of Azerbaijan, 2022a; Republic of Azerbaijan, 2022b). These programs aim to digitize education, integrate technology into teaching practices, and equip students with 21st-century skills.

Additionally, the *Socio-Economic Development Strategy of the Republic of Azerbaijan for 2022–2026* allocates significant attention to the digital development of education. This document identifies digital transformation and the development of human capital as key priorities of socio-economic policy, setting concrete goals for the enhancement of infrastructure and educational content in the virtual space (Republic of Azerbaijan, 2022c).

The equal development of technical infrastructure across regions can create the conditions necessary for ensuring consistent quality in virtual education for all students. In particular, efforts to improve technical capabilities in general education institutions under the Digital Skills project are aligned with this objective (Republic of Azerbaijan, 2022a). Enhancing the digital competencies of teachers and students is essential for the sustainable and effective operation of virtual education systems (Mustafayeva & Bakhshiyeva, 2022; Mustafayeva et al., 2023).

In this context, the Artificial Intelligence Strategy of the Republic of Azerbaijan and the more comprehensive Artificial Intelligence Strategy for 2025–2028, approved

by the Decree of the President of the Republic of Azerbaijan dated March 19, 2025, will serve as major legal and conceptual documents supporting the deep integration of artificial intelligence technologies into virtual education (Republic of Azerbaijan, 2025a; Republic of Azerbaijan, 2025b). These strategies envision the creation of personalized learning systems, the organization of adaptive educational platforms, the automation of instructional algorithms, and the support of teacher activities (Mustafayeva, 2021; Mustafayeva et al., 2024).

Moreover, the improvement of assessment mechanisms, the development of objective and transparent evaluation criteria, and the reinforcement of trust in educational outcomes are critical components of this transformation. In this regard, the STEAM Azerbaijan project, implemented by the Ministry of Science and Education of the Republic of Azerbaijan, plays a vital role in promoting the use of innovative approaches and technological methods in the learning process (Republic of Azerbaijan, 2022d). At the same time, maintaining social interaction and motivation within the educational process is essential to ensure that the virtual environment is also psychologically supportive (Zhao, 2020; Alamri et al., 2020).

Ensuring cybersecurity within the virtual learning environment is another critical issue. Under the Cybersecurity Strategy of the Republic of Azerbaijan (2023–2027), significant measures are planned to enhance information security within the education system, protect personal data, and apply digital ethics standards (Republic of Azerbaijan, 2023). Updating the legal and regulatory framework, and ensuring the legal regulation of online education, are vital to eliminating existing uncertainties in this area (Mustafayeva et al., 2024; UNESCO-IBE, 2023).

Figure 3.3 provides a comprehensive analysis of the challenges of virtual education.

Scientific research in this direction can strengthen the exchange of experience at both the local and international levels and contribute to the formation of new approaches. Future research should address the pedagogical, social, technological, and legal dimensions of digital learning, integrating them within the context of artificial

intelligence and cybersecurity to create more effective and sustainable educational models (Mustafayeva, 2021; Ziker et al., 2021; Hasan et al., 2020).

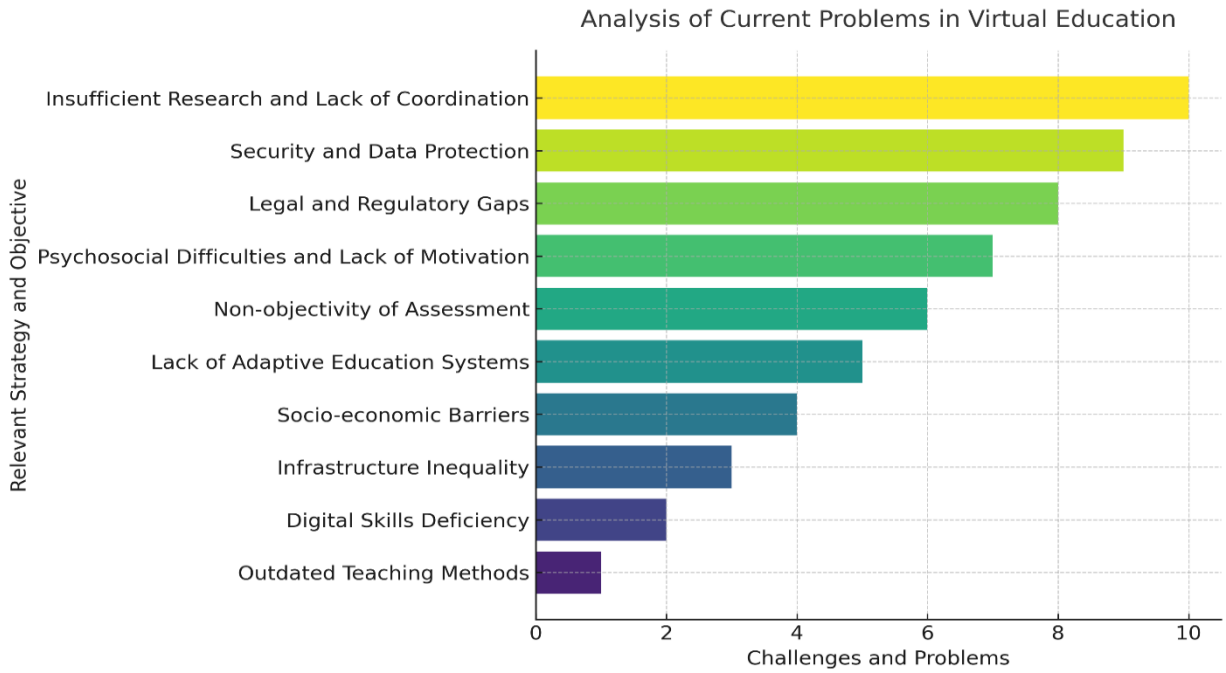

Fig. 3.3. Comprehensive analysis of the challenges of virtual education

As seen from the table 3.4, the development of virtual education is one of the key objectives facing modern education systems. However, the widespread implementation of this field brings forth numerous problems and challenges, each requiring tailored strategies. These strategies are carried out across legal, social, and technological dimensions, aiming not only to improve the quality of education but also to ensure its accessibility (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022; Mustafayeva et al., 2023).

One of the major challenges in the current education system is the outdated nature of teaching methods. To address this issue, the *State Strategy for the Development of Education in the Republic of Azerbaijan* (2013) was adopted, aiming to modernize teaching through the integration of contemporary technologies. As a result of initiatives taken under this strategy, the development of digital pedagogy and the creation of interactive learning environments have been targeted (Republic of Azerbaijan, 2013; Mustafayeva, 2021).

Table 3.4. Strategies for the Development of Virtual Education

Problem / Challenge	Strategy / Policy Document	Objective	Expected Outcome
Outdated teaching methods	State Strategy for the Development of Education (2013)	Align teaching with modern technologies	Development of digital pedagogy and interactive education
Lack of digital skills	Digital Skills project	Enhance digital competencies of teachers and students	Efficient and sustainable teaching in a digital environment
Inequality in infrastructure	Digital Transformation Strategy 2022–2026	Balance technological capacities across regions	Ensure equal access to virtual education
Socio-economic barriers	Socio-Economic Development Strategy 2022–2026	Strengthen human capital and digitize education	Educational equity across social strata
Absence of adaptive learning systems	Artificial Intelligence Strategy 2025–2028	Establish personalized and AI-based learning models	Develop learning algorithms tailored to individual needs
Non-objective assessment practices	STEAM Azerbaijan project & digital assessment initiatives	Transparent and outcome-based assessment	Fair evaluation and increased student motivation
Psychosocial challenges and low motivation	Transformation of educational philosophy	Preserve social interactions in virtual education	Continuous student engagement and active participation
Legal and regulatory gaps	Legal regulation initiatives for online education	Define legal mechanisms	Establish legal stability in virtual education
Data security and information protection	Cybersecurity Strategy (2023–2027)	Ensure information security in virtual education	Protection of personal data and enforcement of digital ethics
Lack of research and coordination	Scientific research and international cooperation strategies	Expand AI and digital education research	Effective integration of new technologies into education

Another significant issue is the insufficient digital skills of teachers and students. The Digital Skills project was implemented to tackle this problem. The main goal of the project is to enhance the digital literacy of educational participants, thereby ensuring their more efficient and sustainable engagement in digital environments (Republic of Azerbaijan, 2022a). Additionally, technological disparities between regions remain a major obstacle to the advancement of virtual education. The Digital Transformation Strategy for 2022–2026 addresses this inequality by aiming to balance

technological infrastructure across all regions, ultimately creating equal educational opportunities for everyone (Republic of Azerbaijan, 2022b).

Socio-economic barriers also hinder the development of virtual education. The Socio-Economic Development Strategy for 2022–2026 was introduced to strengthen human capital and advance the digitalization of education. Through this, progress has been made towards ensuring educational equity across different social groups (Republic of Azerbaijan, 2022c).

Moreover, the lack of adaptive and personalized approaches within the education system must be highlighted. To address this, the Artificial Intelligence Strategy of the Republic of Azerbaijan for 2025–2028 was developed. The main objective of this strategy is to establish AI-based and learner-centered models that expand personalized learning opportunities tailored to individual needs (Republic of Azerbaijan, 2025a; Republic of Azerbaijan, 2025b).

The lack of transparency and objectivity in virtual assessment systems is another critical issue. Efforts such as the STEAM Azerbaijan project and digital assessment initiatives aim to establish more outcome-oriented and fair evaluation systems, ultimately contributing to increased student motivation (Republic of Azerbaijan, 2022d; Mustafayeva et al., 2024).

Furthermore, psychosocial challenges and a lack of motivation negatively impact the spread of virtual education. In response, calls for a transformation in educational philosophy have been made, aiming to protect social interactions in virtual environments and maintain students' consistent interest in learning (Zhao, 2020; Alamri et al., 2020).

The absence of a clear legal and regulatory framework for online education also hinders progress. Legal initiatives for the regulation of virtual education and the establishment of mechanisms for legal stability and standardization have been undertaken to address this gap (Mustafayeva et al., 2024; UNESCO-IBE, 2023). Additionally, the protection of information security and personal data in virtual environments remains a major concern. In this direction, the Cybersecurity Strategy

(2023–2027) was adopted, aiming to safeguard information and ensure digital ethics during virtual education processes (Republic of Azerbaijan, 2023).

Finally, the lack of scientific research and coordination in the field of virtual education impedes further development. Addressing this shortcoming involves expanding research in artificial intelligence and digital education, strengthening international cooperation, and integrating new technologies effectively into educational processes (Mustafayeva, 2021; Ziker et al., 2021; Hasan et al., 2020).

In conclusion, the development of virtual education is not limited to technological issues alone. Systematic approaches, strategic documents, and multi-faceted initiatives are necessary to address the challenges identified. This represents an important step toward building a modern and sustainable education system in Azerbaijan (Mustafayeva et al., 2024; Republic of Azerbaijan, 2022a–2025b).

Based on the analysis above, the following strategic directions are proposed for addressing the problems:

1. Development of digital pedagogy and transformation of teaching methodologies.
2. Improvement of technical infrastructure and ensuring digital equity.
3. Enhancement of digital skills among teachers and students.
4. Improvement of virtual assessment systems.
5. Consideration of social and psychological factors.
6. Development of a comprehensive legal and regulatory framework.

The development of digital pedagogy and the transformation of teaching methodologies are among the most critical issues in the modern education system. In an era marked by the rapid advancement of educational technologies, it has become essential to transition from traditional approaches to digital, interactive, and flexible teaching methods (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022). These transformations not only enhance the effectiveness of instruction but also facilitate greater student engagement in the learning process (Mustafayeva et al., 2023; Ziker et al., 2021).

One of the key supporting factors for this transformation is the enhancement of teachers' and students' digital skills. Through digital tools and online resources, both groups can acquire new theoretical and practical competencies (Alamri et al., 2020; Coursera, 2025; Khan Academy, 2025). The improvement of these skills creates opportunities for the implementation of more flexible and results-oriented approaches in the educational process (edX, 2025; Duolingo, 2025).

The issue of technical infrastructure and digital equity highlights a significant divide between developed and developing countries. Access to the internet and technological tools directly impacts the quality of education (Republic of Azerbaijan, 2022a; UNESCO-IBE, 2023). Therefore, it is crucial to equip every educational institution with modern technical infrastructure and ensure equal access to digital tools. In addition, the improvement of virtual assessment systems constitutes an important component of this matter. Digital assessment tools provide teachers with more objective and transparent methods to evaluate students' knowledge, but it is equally important to enhance the reliability and accuracy of these assessments (Hasan et al., 2020; Mustafayeva et al., 2024). The integration of artificial intelligence and automated proctoring systems can help ensure the integrity of evaluation processes (Republic of Azerbaijan, 2025a).

Social and psychological factors also play a vital role in the adoption of digital technologies within the education system. For inexperienced users, digital teaching methods can sometimes pose challenges (Zhao, 2020; Mustafayeva et al., 2023). Remote education and virtual classrooms may limit students' social interactions, potentially having negative effects on their psychological well-being. Consequently, educational institutions should develop support programs that address students' social and emotional development (Mustafayeva, 2021; Mustafayeva & Bakhshiyeva, 2022).

The legal and regulatory framework is another essential component that regulates and safeguards these transformations. The digital transformation of education necessitates the creation of appropriate legal and ethical standards (Republic of Azerbaijan, 2023; UNESCO-IBE, 2023). Educational institutions and government bodies must establish legislation to ensure the security of digital education, protect

students' personal data, and safeguard teachers' rights. Such legal foundations would make digital education systems more reliable and sustainable, while promoting fairness and equity among all participants (Republic of Azerbaijan, 2023).

Enhancing the digital competencies of teachers and students is one of the fundamental requirements of contemporary education. As digital technologies continue to evolve, their effective use in educational environments becomes increasingly important (Saylor Academy, 2025; Mustafayeva et al., 2024). Teachers must familiarize themselves with new teaching methods and tools and improve their skills in utilizing modern digital platforms. Similarly, students should strengthen their abilities to work with digital tools and resources, improving competencies such as data analysis, online research, digital collaboration, and technological problem-solving. The advancement of these skills will also foster students' capacity for self-directed learning and better prepare them for successful participation in the digital world (Ziker et al., 2021).

The improvement of virtual assessment systems represents a significant step forward in education. With the growing application of remote and hybrid learning models, the reliability and fairness of assessment systems have become more critical (Hasan et al., 2020; Mustafayeva et al., 2024). Virtual assessment tools offer effective means for evaluating students' knowledge; however, these systems must be further enhanced to more accurately and transparently reflect students' achievements. Artificial intelligence and automated evaluation tools can help increase objectivity in assessments (Republic of Azerbaijan, 2025a). Nevertheless, these developments must also address the strengthening of proctoring tools, ensure the validity of assessments, and protect students' personal data. Progress in this area is essential for maintaining the quality and fairness of education.

Considering social and psychological factors is crucial for the broader and more sustainable adoption of digital education (Zhao, 2020; Mustafayeva et al., 2023). The use of digital technologies in education can impact students' social connections and psychological well-being. Remote or online education may lead to feelings of isolation among some students, adversely affecting their mental health. Therefore, educational

institutions should offer support programs that enhance students' social and emotional well-being, strengthen motivation, and promote social interactions (Mustafayeva & Bakhshiyeva, 2022; Mustafayeva et al., 2024). Providing psychological support services for both teachers and students can significantly contribute to their academic success. Socially, it is also important to ensure that digital education is equitable and accessible to all (Coursera, 2025; edX, 2025).

A robust legal and regulatory framework is vital for the effective and secure implementation of digital education (Republic of Azerbaijan, 2023; UNESCO-IBE, 2023). The development of digital education raises legal and ethical considerations that must be addressed. The use of digital tools in education must be regulated by legislation that protects the rights of teachers and students. Issues such as the protection of personal data, the security of online platforms, and copyright for digital educational resources require continuous improvement of the legal framework. Additionally, normative regulations regarding virtual education systems and assessment tools must ensure their fairness and transparency (Republic of Azerbaijan, 2023). The presence of appropriate legal regulations will contribute to the creation of a secure and reliable educational environment for both teachers and students.

The implementation of actions in these directions - enhancing digital competencies, improving virtual assessment systems, considering social and psychological factors, and strengthening the legal framework - are key factors for ensuring the successful application of digital transformation in the modern education system (Mustafayeva, 2021; Hasan et al., 2020; Ziker et al., 2021). These efforts will lead to a more inclusive and effective digital education environment (Mustafayeva et al., 2024; Republic of Azerbaijan, 2025a).

In today's education system, the integration of technologies - particularly artificial intelligence (AI) - plays a significant role in advancing the teaching and learning process. International education platforms such as Coursera, edX, Khan Academy, Duolingo, Saylor Academy, and other similar systems have initiated revolutionary transformations in the field of education by incorporating AI technologies into learning environments (Coursera, n.d.; Duolingo, n.d.; edX, n.d.; Khan Academy, n.d.; Saylor

Academy, n.d.; UNESCO-IBE, 2023). Each of these platforms enables students to receive education tailored to their individual learning styles and needs. By utilizing AI-based systems, these platforms ensure a high degree of precision and transparency in lesson planning, assignment delivery, and monitoring student progress (Figure 3.4).

Fig. 3.4. İnternational Education Platforms

The application of AI enhances the role of instructors in the learning process by assisting in the more effective and personalized presentation of educational content to students. The primary objective of these education platforms is to optimize the learning experience and provide students with opportunities for higher levels of achievement (Coursera, n.d.; Duolingo, n.d.; edX, n.d.; Khan Academy, n.d.; Saylor Academy, n.d.; UNESCO-IBE, 2023). With the integration of AI, each student can progress at their own pace and in areas of personal interest. These systems track users' learning patterns, identify their strengths and weaknesses, and personalize instructional content accordingly. The aim is to make the teaching process more efficient and student-centered.

The operational mechanisms of these platforms are based on AI algorithms. Initially, the platforms monitor student learning behavior - this includes tracking viewed lessons, completed assignments, and topics that capture the student's interest. These data are collected and analyzed by AI algorithms, which then deliver content best suited to the student's prior activities. Furthermore, the system identifies areas of weakness and offers additional resources and assignments tailored to address them. For

instance, if a student struggles with a particular topic, the platform provides supplementary materials and explanations related to that subject.

AI applications also evaluate students' achievements and adjust the difficulty level of lessons according to their competencies. Additionally, the use of AI-driven teaching assistants, often referred to as intelligent tutoring systems, allows platforms to monitor student responses to lessons and provide immediate feedback. This real-time support helps students overcome challenges promptly and enhances the overall learning process. Consequently, the implementation of AI in education plays a critical role in addressing students' individual needs and facilitating more effective learning. The use of these technologies is transforming the learning process into one that is more adaptive, interactive, and personalized, paving the way for education to become increasingly individualized and globally accessible in the future.

The application of AI technologies in education continues to drive profound global transformations in the modern era. These technologies offer significant opportunities for adapting, personalizing, and organizing the teaching process more flexibly. AI-based models employed by international education platforms aim to enhance the efficiency of teaching by analyzing users' knowledge levels, learning speeds, and interests, and by creating personalized learning pathways accordingly. In the context of the Azerbaijani education system, the implementation of such technologies must be grounded in specific theoretical and methodological foundations. For the successful integration of the traditional education structure into the modern technological environment, personalized instructional approaches and real-time feedback mechanisms are of particular importance. Analyzing students' academic performance through AI allows for the timely identification of learning gaps and the provision of appropriate resources to support students throughout their learning journey.

Additionally, the integration of virtual reality (VR) elements into the educational process creates favorable conditions for the visualization of the classroom environment and the organization of experiential learning. These technologies automate lesson planning and assessment activities, enabling teachers to focus more effectively on the

instructional process. As a result of AI implementation, open educational resources are expanding, making education more accessible and democratic. In Azerbaijan, the application of these models must be guided not only by technological considerations but also by theoretical foundations and strategic pedagogical approaches. To achieve this, it is essential to enhance the digital competencies of teaching staff, align educational programs with AI capabilities, and equip learning environments with flexible, adaptive models. Thus, the integration of AI technologies into education should be viewed not merely as a technological innovation, but as a fundamental step toward the modernization of educational philosophy. The operational principles and mechanisms of AI-Based Educational Systems (AIBES) are illustrated in Figure 3.5.

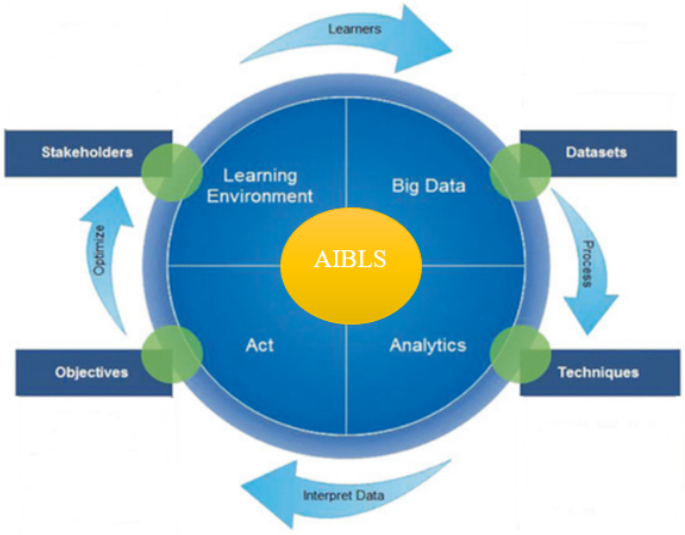

Figure 3.5. The Operational Principle of Artificial Intelligence-Based Learning Systems (AIBLS)

The findings of this study underscore that virtual education is far more than a technological innovation; it represents a profound transformation of the educational paradigm, encompassing pedagogical, social, cultural, and organizational dimensions. While the COVID-19 pandemic served as a catalyst for the rapid adoption of digital learning solutions, the integration of virtual education into Azerbaijan's national education system has highlighted a range of structural, methodological, and infrastructural challenges. Comparative analysis with international best practices

reveals that successful implementation requires a strategic, multi-layered approach that combines robust digital infrastructure, comprehensive teacher training, interactive and student-centered pedagogical models, and clear legal and regulatory frameworks. To achieve sustainable and high-quality virtual education in Azerbaijan, the following strategic priorities are recommended:

1. Formulation of a Strategic Approach:

- Virtual education must be recognized as a central component of national education policy, supported by a comprehensive long-term action plan.
- Legal and regulatory frameworks should be updated to establish clear standards for digital education, ensuring accountability, equity, and sustainability.

2. Enhancement of Digital Infrastructure:

- Expansion of internet access and provision of modern technical equipment in regional schools and higher education institutions are essential.
- Partnerships with local and international digital platforms (e.g., Moodle, Google Classroom, AI-driven platforms) should be strengthened to provide advanced tools for teaching and learning.

3. Improvement of Teacher Training:

- Continuous professional development programs in digital pedagogy, technological competencies, and innovative teaching methods should be institutionalized.
- Teacher education curricula should integrate courses on digital instruction and adaptive learning strategies to prepare educators for the evolving digital landscape.

4. Modernization of Assessment Systems:

- Reliable and transparent evaluation mechanisms, including proctoring technologies, AI-assisted assessment tools, and adaptive testing systems, should be implemented.
- Assessment should move beyond outcomes to evaluate the learning process itself, providing actionable insights to improve both teaching and student engagement.

5. Enhancement of Student Motivation and Participation:

- Gamification, project-based learning, and interactive content should be widely adopted to foster engagement and active learning.

- Personalized learning pathways should be developed, leveraging AI and data analytics to cater to individual student needs and interests.

6. Ensuring Social Equity in Education:

- Government initiatives should guarantee access to computers, tablets, and internet connectivity for disadvantaged students.

- Inclusive and adaptive teaching models must be designed to accommodate learners with disabilities and diverse educational needs.

7. Fostering Positive Public Perception of Virtual Education:

- Awareness campaigns should engage parents, teachers, and the broader public to communicate the benefits and opportunities of virtual learning.

- Success stories, innovative practices, and outcomes in virtual education should be publicly highlighted to build confidence and societal support.

In conclusion, the development of virtual education in Azerbaijan represents a multidimensional endeavor that requires strategic vision, institutional commitment, and continuous innovation. By integrating these priorities into national education policies and practice, Azerbaijan can ensure that virtual education not only complements traditional methods but also fosters a more equitable, adaptive, and future-ready learning environment. This transformation has the potential to enhance educational quality, promote lifelong learning, and prepare students for successful participation in an increasingly digital and interconnected world.

3.4. Challenges and solutions in virtual education

The relevance of virtual education is due to the rapid development of information and communication technologies and the growing need for accessible, flexible and continuous learning. Modern society requires new forms of organizing the educational process, which allow acquiring knowledge regardless of location and time. Virtual education ensures individualization of learning, contributes to improving the quality of

educational services and creates conditions for the integration of Ukraine into the global educational space. Its development is especially important in the context of digitalization of education, globalization and the need to adapt to the challenges of the modern world.

Such foreign and domestic scientists have devoted their works to the study of issues of virtual and distance education, as Berezivska R. (2024), Della Shinta Bestiantono (2020), Chemerys H. (2020), Kotenko S.I. (2023), Eliseeva O. (2020), Eliseev E. (2020), Groff J. (2013), Ilchenko A.M. (2023), Kasych A. (2024), Kiv A. (2020), Koniukhov S. (2020), Kruhlyk VS (2020), Nevmerzhytska S. (2023), Lan Y. (2022), Lin Y. (2022), Moore MG (2013), Olshanska O., Osadchyi V. (2020), Osadcha K. (2020), Salnyk I.V., Semenyshyna I.V. (2023), Pogrebnyak M.G. (2024), Putri Zulaiha Ria Augustine (2020), Sikora Ya.B. (2024), Siryk E.P., Steven Mintz, Tereshchuk V.I. (2023), Tsung-Hui Cheng (2020), Tsalko T. (2023), Vasilyeva T.A. (2023), Wang S. (2022), Yatsenko O.I. (2024), et al.

However, this topic requires further research to understand the effectiveness of digital technologies in the educational process. In addition, it allows to improve the methods of virtual education and distance learning and ensure equal access to quality education for all.

The purpose of the study is to identify the opportunities, advantages, and challenges of using digital technologies in the educational process to improve the quality of education, develop innovative teaching methods, and ensure the accessibility of educational resources to a wide range of users.

Based on the goal, the following tasks were set and solved: analysis of decisions made by universities regarding the introduction of virtual education into the educational process, identification of prospects for the development of virtual learning and existing problems, as well as ways to eliminate them.

Virtual education is a form of learning in which the educational process takes place in a digital (online) environment using information and communication technologies. In other words, it is education organized using the Internet, where students and teachers interact not physically, but through virtual platforms**.** In the

source by the authors I.V. Salnik, E.P. Sirik concludes that virtual learning today is a mirror that reflects how new information technology is used in education, how we know and understand this new information technology.

University decisions in virtual education cover a wide range of approaches – from strategic planning to the implementation of specific technologies. Figure 3.6. presents a systematic overview of the main types of decisions that universities make to effectively organize virtual learning.

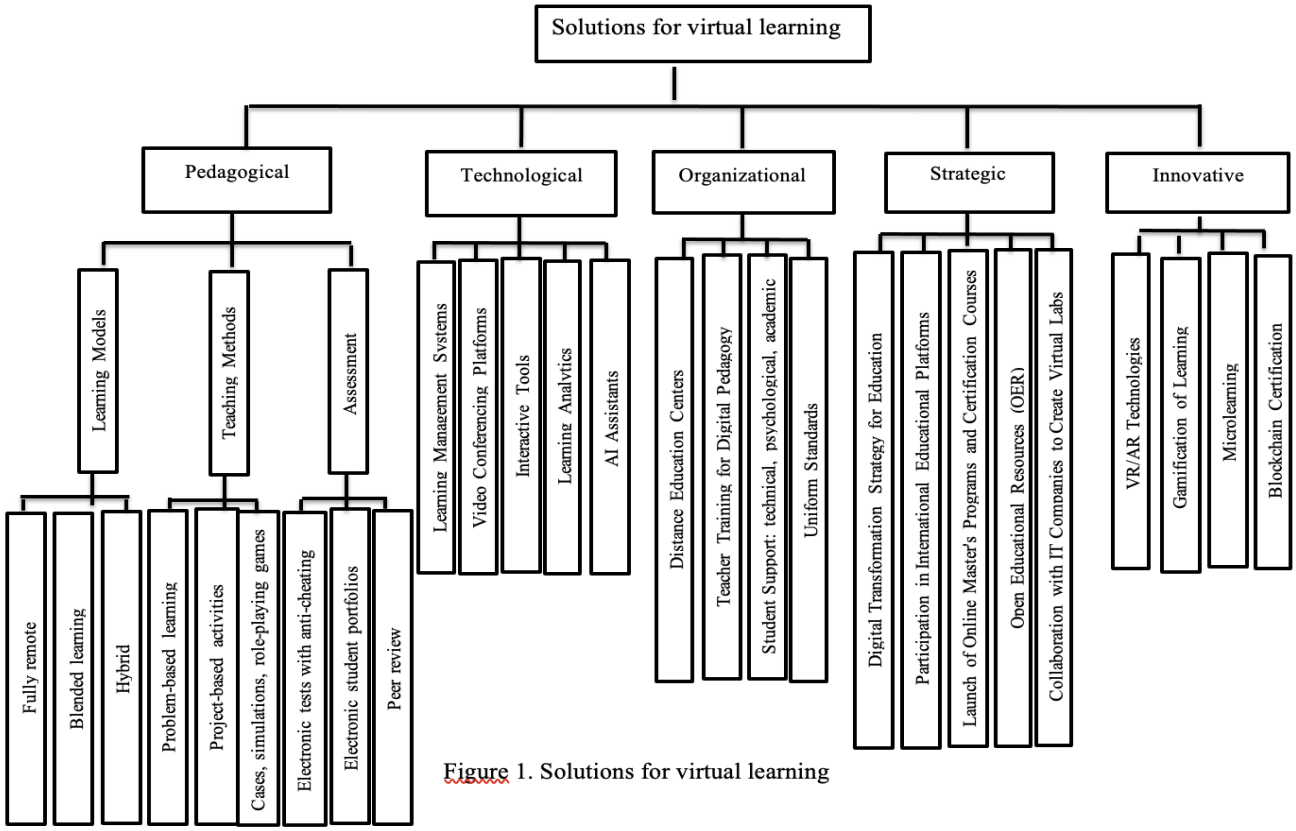

Figure 1. Solutions for virtual learning

Pedagogical solutions in virtual education of universities consist in determining how the learning process is organized and implemented in an online environment. Universities choose an appropriate learning model, which can be completely distance (online programs), mixed – when traditional and online classes are combined (blended learning), or hybrid, combining synchronous and asynchronous formats of interaction between teachers and students.

An important role is also played by teaching methods aimed at activating students' cognitive activity. These include problem-based learning, project activities, the use of cases, simulations, and role-playing games in a virtual environment, which contributes to the formation of practical skills and the development of critical thinking.

An equally important component is the system of assessment of learning outcomes, which in virtual education takes on new forms. In particular, electronic tests with anti-cheating mechanisms are used, electronic portfolios of students are created, and peer review is used - mutual assessment of each other's work by students, which stimulates independence and responsibility in the educational process.

Technological solutions are the foundation of virtual education, because they ensure its effective functioning and development. The basis of the technological infrastructure is learning management systems (LMS), such as Moodle, Canvas, Google Classroom, Open edX. They allow to organize the learning process: post educational materials, conduct testing, track results, communicate between teachers and students, and provide feedback.

An important component is video conferencing platforms (Zoom, Microsoft Teams, BigBlueButton, Webex), which create the possibility of synchronous interaction between training participants. They are used to conduct lectures, seminars, consultations and discussions in real time, which helps to maintain the effect of presence even in a remote format.

To increase student engagement and develop interactivity, modern interaction tools are used – Miro, Padlet, Kahoot!, Mentimeter. They help diversify the learning process, develop creativity, stimulate teamwork and active participation of students.

In addition, learning analytics plays an important role (Learning Analytics), which allows you to track the success, activity, and learning dynamics of each student, which helps to identify difficulties in a timely manner and increase the efficiency of the learning process.

A new stage in the development of virtual education is the introduction of artificial intelligence (AI) systems. Such solutions provide personalized recommendations to students, perform automatic assessments, and assist teachers in creating content and

adapting educational materials. The use of AI improves the quality of the educational process, making it more individualized, technological, and effective.

Organizational solutions in virtual education are aimed at ensuring the effective functioning of the entire distance learning system. For this purpose, distance education centers are created – structural units of the university, which are responsible for the development, implementation and support of online courses. An important component is the training of teachers for digital pedagogy, which involves the development of competencies in the use of modern educational technologies and interactive teaching methods. Considerable attention is paid to student support, which covers technical, psychological and academic aspects, contributing to comfortable and effective learning. In addition, uniform standards are introduced regarding the format of courses, the quality of educational content and compliance with ethical norms in the virtual educational environment.

Strategic decisions in the field of virtual education of universities are long-term in nature and are aimed at the systematic development of the educational environment, its modernization and increasing the competitiveness of the institution. One of the key areas is the development of a strategy for the digital transformation of education, which involves the gradual introduction of the latest technologies into all aspects of educational and scientific activities.

An important strategic step is the participation of universities in international educational platforms, such as Coursera, edX, FutureLearn, which allows them to integrate into the global educational space, expand their audience, and increase the prestige of the institution. The opening of online master's and certificate programs, which provide access to quality education for a wide range of students, including foreign ones, is also of great importance.

Among the priorities of strategic development is the use of open educational resources (OER), which contribute to the dissemination of knowledge, academic collaboration and ensuring academic integrity. An important component is the cooperation of universities with IT companies to create modern virtual laboratories, which allow for experiments, research and practical classes in a digital format.

In general, strategic decisions in virtual education form the basis for the sustainable development of universities, contribute to their digital modernization, international integration, and improve the quality of educational services.

Innovative solutions in virtual education play a key role in increasing its efficiency, attractiveness and compliance with modern technological trends. One of the most promising areas is the use of VR/AR technologies (virtual and augmented reality), which create the opportunity for students to immerse themselves in the learning environment. With the help of such technologies, virtual laboratories and 3D-models are implemented, which are actively used in the fields of engineering, medicine, architecture and natural sciences. This allows you to recreate real experimental conditions without risk to equipment or students' health.

An important place among innovations is occupied by gamification of learning, that is, the use of game elements in the educational process. Such elements include badges, ratings, points, and competitions between students, which increase motivation for learning, form healthy competition, and promote active participation in completing tasks.

Another innovative approach is the introduction of microlearning – short, practically oriented training modules aimed at acquiring specific knowledge or skills. This form of training is particularly effective for developing professional competencies and allows you to quickly adapt to the demands of the modern labor market.

Blockchain certification attracts special attention, which provides secure and transparent verification of diplomas and certificates. The use of blockchain in education guarantees the authenticity of received documents and simplifies the process of verifying qualifications, which increases trust in online education among both students and employers.

Thus, innovative solutions in virtual education not only modernize the educational process, but also make it more flexible, technological, and focused on the needs of the modern student. Examples of solutions in virtual education of leading Ukrainian universities are given in Table 3.5.

Table 3.5. Virtual education solutions from leading Ukrainian universities

University	Solutions in virtual education
National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»	implementation of your own LMS « Sikorsky Distance Learning»
Lviv Polytechnic National University	Moodle with Zoom integration and learning analytics
Taras Shevchenko National University of Kyiv	using the Google platform Workspace for Education
Ukrainian Catholic University	full integration of digital pedagogy and hybrid courses
Kyiv National University of Technologies and Design	implementation of a learning management system Moodle , video conferencing platforms Zoom , Microsoft Teams , Google Meet , tools for interacting with applicants Kahoot !, Mentimeter

Thus, Ukrainian universities are quite actively implementing virtual education, responding to the needs of modern society and the challenges of digital transformation. Virtual education is gradually becoming an integral part of modern Ukrainian higher education.

Within the framework of this study, it is appropriate to analyze the prospects, advantages, as well as disadvantages and problems of virtual education, since this format of training is becoming an integral part of the modern educational system. At the same time, virtual education has a number of challenges, including an insufficient level of social interaction, technical limitations and the need for a high level of student self-organization. The issues of problems and prospects of virtual education are discussed in the work (Eliseeva, O., & Eliseev, E., 2020; Vasilyeva, T.A., & Kotenko, S. I. (Eds.) 2023; Salnyk, I.V., & Siryk, E.P. (n.d.); Tsalko, T., & Nevmerzhytska, S., 2023). A comprehensive study of both positive and problematic aspects allows us to reasonably assess the effectiveness of distance learning and develop ways to improve it.

The main advantages of virtual education include:

1. Flexible schedule.

2. You can study at a convenient time, combining it with work or other activities.

3. Accessibility from anywhere.

4. All you need is the Internet and you can study from home or from another country.

5. Variety of courses and programs. You can find courses online on any topic – from programming to art.

6. Cost savings. Online learning is often cheaper than face-to-face learning, with no travel, accommodation, etc. costs.

7. Independent learning and discipline development Students learn to organize their time and take responsibility for their studies.

8. Ability to view recorded materials. If you miss a class, you can watch the lesson later.

The disadvantages of virtual education include the following:

1. Lack of live communication. Less social interaction with teachers and other students.

2. Weak motivation. Not everyone finds it easy to learn without direct supervision – it's easy to get distracted or procrastinate.

3. Problems with technical support. Not everyone has stable Internet or modern technology.

4. Not all subjects are suitable for an online format . For example, lab work, medical practicum, or art require face-to-face participation.

5. Fewer opportunities to develop soft skills (soft skills). For example, teamwork, public speaking, etc.

6. Problems with the quality of individual courses. Some online courses are superficial or irrelevant.

A separate study is required to identify emerging problems in virtual education in Ukraine related to the war unleashed by the Russian Federation and to find ways to solve them. The war in Ukraine has become a serious challenge for the entire education system, in particular for the development of virtual education. Although distance learning has become the main tool for preserving the educational process in conditions of danger, it has also revealed a number of problems related to technical, psychological and organizational aspects.

Problems of virtual education during war:

1. Unstable Internet connection and power outages. Due to shelling of infrastructure, students and teachers often lack access to electricity and stable internet, making regular online classes impossible and reducing the quality of education.

2. Psychological stress and loss of motivation. War causes stress, anxiety, and emotional exhaustion. It is difficult to focus on learning in such conditions, especially when people are in danger or have lost loved ones.

3. Unequal access to technical means. Not all students have computers, smartphones, or headphones, making it difficult to participate in classes. Some families are forced to share one device among multiple children.

4. Loss of interactivity and social interaction**.** The online format reduces the amount of live communication, which is important for the formation of students' communication and social skills.

5. Organizational difficulties. Universities had to quickly adapt curricula, ensure data security, and move document management online. This required additional resources and time.

Ways to solve problems:

1. Technical support and flexible training format. Universities are introducing asynchronous courses that allow students to review materials at their own pace, even without constant internet access. Some institutions are partnering with volunteers and international organizations to provide students with technology.

2. Psychological support. Online psychological support groups are being created, stress resistance training is being conducted, and consultations with psychologists are being held. Educational institutions are increasingly including mental health topics in their programs.

3. International cooperation. Many Ukrainian universities have received support from foreign partners – grants, access to international platforms, joint double degree programs. This helps ensure continuity of education.

4. Development of digital infrastructure. Backup educational servers and mobile platforms are being created that work even with low Internet speeds. Cloud services are being used to maintain access to materials even in crisis conditions.

5. Improving digital literacy of teachers and students. The war accelerated the process of mastering modern teaching technologies. Universities are conducting advanced training courses, where teachers are taught to work with platforms such as Zoom, Moodle, and Google Classroom, etc.

Therefore, virtual education is a modern form of learning in which the educational process takes place in a digital environment using information and communication technologies. To implement virtual education, universities make pedagogical, technological, organizational, strategic, and innovative decisions. There are both advantages and disadvantages of virtual education. The war became an impetus for profound changes in the education system of Ukraine. Virtual education has proven its viability and flexibility, becoming not just a forced alternative, but a powerful tool for preserving the intellectual potential of the nation. Overcoming technical and psychological challenges, developing digital infrastructure, and international support create the basis for a new quality of education - modern, sustainable, and accessible even in the most difficult conditions.

CHAPTER 4
REGIONAL CASE STUDIES

4.1. Italy's approach to entrepreneurial education

In the last two decades, Italy has undergone a significant transformation in its approach to entrepreneurship education, moving from a marginal, business-oriented subject to a transversal competence recognized as essential for active citizenship, employability, and social innovation (European Commission, 2018; Lackéus, 2015; OECD, 2019). This evolution has been driven by both European policy - especially the adoption of the EntreComp framework - and by national reforms such as the Buona Scuola law and the National Digital School Plan, which have promoted project-based learning, digital skills, and internationalization as core pillars of the education system (Bacigalupo et al., 2016; MIUR, 2015; Cedefop, 2022).

Entrepreneurship education is now positioned at the intersection of economic, social, and technological change, reflecting the need for young people to develop autonomy, creativity, and adaptability in a rapidly evolving labor market (Fayolle & Gailly, 2008; OECD, 2015; Bocconi et al., 2022). The integration of virtual exchanges and digital tools has further accelerated this shift, enabling broader access to entrepreneurial learning and fostering intercultural dialogue and peer-to-peer collaboration (O'Dowd, 2023; Helm, 2020; Cinganotto & Pagano, 2022).

Despite these advances, the Italian context remains characterized **by significant regional disparities, fragmented governance, persistent gaps in teacher training and digital infrastructure, and limited evaluation of program impact** (Cedefop, 2022; OECD, 2022; Bocconi et al., 2022). The COVID-19 pandemic exposed and exacerbated these vulnerabilities, but also catalyzed digital innovation and experimentation with new forms of virtual mobility and online collaboration (Rapanta et al., 2020).

European projects such as VEHUB4YOU have played a catalytic role in this landscape, providing a platform for the creation of Virtual Youth Business Hubs and supporting the development of digital, collaborative, and entrepreneurial competences

among Italian youth (VEHUB4YOU Consortium, 2024). This chapter analyzes the Italian experience by examining public policies, educational models, and teaching practices that define national entrepreneurship education and virtual exchange initiatives. It also explores the contributions of Italian partners to VEHUB4YOU, highlighting both achievements and ongoing challenges, and offering evidence-based recommendations for future policy and practice.

Entrepreneurship Education in Italy: National Landscape

Entrepreneurship education in Italy has evolved from a marginal and business-centric subject to a transversal competence recognized at the policy level as essential for citizenship, employability, and innovation (European Commission, 2018; Bacigalupo et al., 2016; OECD, 2019; Cedefop, 2022). This evolution is the result of a complex interplay between European policy drivers, national reforms, and local experimentation, but is still characterized by **heterogeneity, fragmentation, and persistent structural barriers** (Cesaroni & Galvani, 2025; Cedefop, 2022; OECD, 2019).

Policy Framework and Strategic Directions

Italy does not have a unified national strategy for entrepreneurship education, but it aligns its efforts with the European Entrepreneurship Competence Framework (EntreComp), which provides a reference for defining and developing entrepreneurial competences at all levels of the education system (Bacigalupo et al., 2016; Cedefop, 2022). The EntreComp framework, adopted in Italy since 2016, has informed the development of the national Syllabus for Entrepreneurship Education (Sillabo per l'Educazione all'Imprenditorialità), which offers guidelines for upper secondary schools and supports the design of curricular and extracurricular activities (Cedefop, 2022).

The main policy instruments include:

- **pathways for transversal skills and guidance (PCTO):** Introduced by Law 107/2015 (Buona Scuola) and reformed in 2018, PCTO are compulsory for all upper

secondary students and integrate practical, work-based, and entrepreneurial experiences into school curricula (MIUR, 2015; MIUR, 2022; Cedefop, 2022);

- **syllabus for entrepreneurship education:** Developed by the Ministry of Education and Merit, this syllabus is based on EntreComp and provides teachers with methodologies and topics for entrepreneurship education, supporting both curricular and extracurricular pathways (Cedefop, 2022);

- **National digital school plan (PNSD):** Promotes digital innovation and the integration of digital tools in teaching, which are essential enablers for modern entrepreneurship education (MIUR, 2015; OECD, 2019).

Implementation in Schools and VET

Entrepreneurship education is present in most technical and vocational schools, where strong links with industry, professional practice, and hands-on experience are recognized as key enablers of entrepreneurial competence (Cedefop, 2022; OECD, 2022). The minimum compulsory hours for PCTO are 210 in vocational schools, 150 in technical schools, and 90 in general education (licei), reflecting the differentiated approach to practical and entrepreneurial learning (Cedefop, 2022; MIUR, 2022).

Programs such as **Impresa in Azione** (Junior Achievement) and regional initiatives (e.g., social cooperative simulations in Trentino, startup creation in Puglia) have involved more than 100,000 students in simulated entrepreneurship activities, while VET programs emphasize business planning, teamwork, and innovation through real-world projects (Cedefop, 2022; Calabria, 2021). The literature confirms that experiential, project-based, and interdisciplinary approaches are most effective in fostering entrepreneurial mindsets and skills (Lackéus, 2015; Moberg et al., 2014; Ruskovaara & Pihkala, 2015).

Higher Education and the Entrepreneurial University

At the university level, the situation is more fragmented and concentrated in economics, management, and engineering faculties (Iacobucci & Micozzi, 2012; OECD, 2019; Cesaroni & Galvani, 2025). The **Contamination Labs (CLab),** launched by MIUR in 2012, represent a recognized best practice, fostering

interdisciplinary teams, knowledge contamination, and the use of digital technologies for entrepreneurial learning (Secundo et al., 2020; OECD, 2019). However, entrepreneurship education in Italian universities remains underdeveloped compared to other European countries, with most courses concentrated in business faculties and limited diffusion in STEM and humanities (Iacobucci & Micozzi, 2012; OECD, 2019; Cesaroni & Galvani, 2025). Recent studies highlight the emerging role of alumni networks and academic incubators in fostering entrepreneurial ecosystems and peer learning (Cesaroni & Galvani, 2025; OECD, 2019; Curci & Micozzi, 2014).

Table 4.1. Main Pedagogical Models and Their Relevance. Authors' elaboration.

Model/Approach	Key Features	Relevance in Italy	References
Experiential Learning	Learning by doing, reflection, iteration	Core of PCTO, CLab, Impresa in Azione	Kolb (1984); Lackéus (2015)
Project-Based Learning	Team projects, real-world challenges	Widespread in PCTO, innovation labs	Thomas (2000); Fayolle & Gailly (2008)
Simulation-Based Learning	Virtual companies, business games	Used in secondary and university programs	Cedefop (2022)
Interdisciplinary/CLab	Cross-faculty, open innovation, co-creation	Best practice in leading universities	Secundo et al. (2020); OECD (2019)
Digital/Blended Learning	Integration of online tools and platforms	Accelerated post-2020, unevenly spread	Bocconi et al. (2022); MIUR (2015)

Persistent Barriers and Critical Issues

Despite policy progress and the proliferation of innovative practices, several **structural barriers** persist:

- **Regional and institutional disparities:** There is a marked North-South divide in the availability of resources, digital infrastructure, and the quality of entrepreneurship education (OECD, 2022; Cedefop, 2022).

- **Teacher training gaps:** Most teachers lack formal preparation in entrepreneurship education and digital pedagogy; professional development is often project-based and not systemic (Bocconi et al., 2022; Corsaro et al., 2021).

- **Fragmented governance:** Multiple authorities (ministries, regions, schools, universities) share responsibility, leading to inconsistent implementation and resource allocation (Cedefop, 2022; OECD, 2019).

- **Assessment and evaluation challenges:** There is no standardized system for evaluating entrepreneurial competence or program impact, limiting evidence-based policy (Moberg et al., 2014; Fayolle et al., 2006; Cesaroni & Galvani, 2025).

- **Cultural attitudes:** Entrepreneurship is still often perceived as a business or vocational topic, rather than a transversal competence for all, restricting its uptake in non-economic fields and among underrepresented groups (Neck & Greene, 2011; Lackéus, 2015; OECD, 2019).

Recent bibliometric reviews and policy analyses confirm that Italy's entrepreneurship education system is in a **phase of transition**, moving from fragmented pilot initiatives to a more systemic, competence-based, and digitally integrated model (Cesaroni & Galvani, 2025; Cedefop, 2022; OECD, 2019). However, the pace and depth of change remain uneven, and further efforts are needed to ensure equitable access, robust teacher training, and effective impact evaluation.

Virtual Exchanges in Italian Education

Virtual exchanges have become a structural pillar in Italy's strategy for internationalization, digital transformation, and equity in education. Their expansion is both a response to European policy imperatives and to the need to democratize access to intercultural and entrepreneurial learning, particularly for students who face economic, geographic, or social barriers to physical mobility (European Commission, 2020; O'Dowd, 2023; Cinganotto & Pagano, 2022).

Policy Context and Strategic Rationale

The European Commission's definition of virtual exchanges as technology-enabled, people-to-people, facilitated, and sustained interactions between individuals from different cultural backgrounds (European Commission, 2020) is now widely adopted in Italy. Virtual exchanges are explicitly promoted in national policy

documents as a means to foster transversal, digital, and intercultural competences, in line with the Digital Education Action Plan and the Piano Nazionale Scuola Digitale (MIUR, 2015; European Commission, 2021). The National Operational Program (PON) Scuola has provided targeted funding for digital innovation and virtual mobility, particularly in disadvantaged regions (INDIRE, 2019).

Italy's strong engagement with European initiatives, such as eTwinning and Erasmus+ Virtual Exchange, reflects a broader policy shift: from mobility as a privilege for the few to internationalization at home as a right for all (Beelen & Jones, 2015; Helm, 2020). This is especially relevant in a country marked by persistent regional disparities in access to international experiences and digital resources (OECD, 2022).

Diffusion, Models, and Main Programs

Italy is a European leader in virtual exchange participation. By 2022, over 104,000 Italian teachers were registered on eTwinning, making Italy the second largest contributor in Europe, with more than 35,000 collaborative projects since 2005 (INDIRE, 2022). These projects have engaged hundreds of thousands of students in digital collaboration, intercultural dialogue, and multidisciplinary activities, often with a focus on entrepreneurship, sustainability, and digital skills (Cinganotto & Pagano, 2022).

Erasmus+ Virtual Exchange (2018–2023) has further expanded the reach of these practices, engaging over 25,000 young people in cross-border online collaboration, with a significant Italian component (European Commission, 2020; Helm, 2020). The program's emphasis on intercultural competence, teamwork, and digital project management aligns with the EntreComp framework and national curricular reforms (Bacigalupo et al., 2016; MIUR, 2015).

In higher education, universities such as Padova, Roma Tre, and Turin have developed telecollaboration, blended mobility, and online project-based learning, often awarding digital badges and ECTS credits for participation (Baroni et al., 2019; Helm, 2020). These experiences are supported by national and European funding, but their

diffusion remains uneven and often dependent on the initiative of individual educators or internationally oriented institutions (Beelen & Jones, 2015; Baroni et al., 2019).

Table 4.2. Key Virtual Exchange Programs in Italy. Authors' elaboration.

Program	Description	Participants	Key Benefits	References
eTwinning	European platform for school collaboration, digital projects	104,877 teachers, 35,764 projects	Digital skills, interculturality, entrepreneurship	INDIRE (2022); Cinganotto & Pagano (2022)
Erasmus+ Virtual Exchange	EU-funded, cross-border online collaboration	25,000+ youth	Intercultural competence, soft skills, entrepreneurship	European Commission (2020); Helm (2020)
PON Scuola	National program for digital innovation and inclusion	Varies by project	Digital equity, blended learning, inclusion	MIUR (2015); INDIRE (2019)
University Telecollaboration	Virtual language/culture exchange (Padova, Roma Tre, Turin, etc.)	Hundreds of students per year	Language, intercultural, digital and global citizenship skills	Baroni et al. (2019); Helm (2020)
VEHUB4YOU	Virtual Youth Business Hubs for entrepreneurship	Schools and universities in Italy	Digital entrepreneurship, peer collaboration, inclusion	VEHUB4YOU Consortium (2024)

Pedagogical Models and Impact

Virtual exchanges in Italy are grounded in constructivist, collaborative, and intercultural pedagogies (Vygotsky, 1978; Deardorff, 2006; Dooly & O'Dowd, 2012). Projects typically involve co-design of tasks, real-world problem solving, and digital co-creation, supported by trained facilitators and digital platforms (Helm, 2020; O'Dowd, 2023). Empirical studies show that participation in virtual exchanges enhances digital literacy, intercultural competence, teamwork, and entrepreneurial mindset, particularly among students from non-economic disciplines or disadvantaged backgrounds (Slaouti & Motteram, 2020; Beelen & Jones, 2015; Baroni et al., 2019).

The eTwinning program, for example, has demonstrated positive effects on students' digital skills, intercultural awareness, and collaborative problem-solving abilities (INDIRE, 2022; Cinganotto & Pagano, 2022). The eTandem project at the

University of Padua, which won the European Language Label, has shown that virtual exchanges foster multilingualism, digital autonomy, and inclusive peer learning (Baroni et al., 2019). In the context of entrepreneurship education, virtual exchanges have been shown to develop self-efficacy, leadership, and digital project management skills (Slaouti & Motteram, 2020; VEHUB4YOU Consortium, 2024).

Critical Challenges and Barriers

Despite these advances, several systemic challenges persist:

- **Teacher Training:** Many educators lack formal preparation in digital and intercultural facilitation, limiting the scalability and quality of virtual exchanges (O'Dowd, 2015; Helm, 2020; Baroni et al., 2019).

- **Digital Divide:** Significant disparities in digital infrastructure and access persist, especially in Southern Italy and rural areas, exacerbating educational inequalities (Cinganotto & Pagano, 2022).

- **Curriculum Integration:** Virtual exchanges are often implemented as extracurricular or pilot activities, with limited formal recognition or integration into mainstream curricula (Beelen & Jones, 2015; Baroni et al., 2019).

- **Assessment and Certification:** There is a lack of standardized systems for certifying competencies acquired through virtual exchange, limiting their recognition in educational and professional pathways (Guth et al., 2020; European Commission, 2021).

- **Sustainability:** Many initiatives depend on project-based funding and the enthusiasm of individual teachers or institutions, raising questions about long-term scalability and institutionalization (Helm, 2020; Cinganotto & Pagano, 2022).

Systemic Impact and Future Directions

The COVID-19 pandemic acted as a catalyst for digital and virtual innovation, prompting Italian schools and universities to experiment with cross-national online collaboration at an unprecedented scale (Rapanta et al., 2020; Bocconi et al., 2022). While many of these experiences were emergency-driven, they have established a

foundation for more systemic adoption of virtual exchanges in post-pandemic education (Helm, 2020; O'Dowd, 2023).

The VEHUB4YOU project, by creating Virtual Youth Business Hubs, exemplifies how virtual exchanges can be leveraged for entrepreneurial education, digital inclusion, and transnational peer learning. The Italian experience suggests that the future of virtual exchanges will depend on policy integration, investment in teacher training, robust digital infrastructure, and the development of assessment and certification frameworks that recognize competences acquired through virtual and blended mobility (European Commission, 2021; Cedefop, 2022; Helm, 2020).

Italy's Role in the VEHUB4YOU Project

Italy's participation in the VEHUB4YOU project constitutes a paradigmatic example of how national educational innovation can be both shaped by and contribute to European trends in entrepreneurial education and digital transformation. The Italian case is especially relevant in the context of persistent regional disparities, the need for digital inclusion, and the ongoing challenge of integrating entrepreneurship as a transversal competence across all educational levels (OECD, 2022; Bacigalupo et al., 2016).

Strategic Alignment with National and European Policy

The Italian contribution to VEHUB4YOU is rooted in a long-term process of policy alignment with European frameworks such as EntreComp (Bacigalupo et al., 2016) and the Digital Education Action Plan (European Commission, 2021). Italy's Piano Nazionale Scuola Digitale (MIUR, 2015) and the compulsory integration of PCTO pathways have laid the groundwork for embedding entrepreneurial and digital competences in curricula, with VEHUB4YOU acting as a testbed for the next step: the virtualization and internationalization of entrepreneurial learning environments. This approach is consistent with the internationalization at home paradigm, which seeks to democratize access to global competences for all students, regardless of their ability to participate in physical mobility programs (Beelen & Jones, 2015).

Pedagogical Innovation and Knowledge Contamination

A key feature of the Italian role in VEHUB4YOU is the emphasis on pedagogical innovation, especially through the integration of project-based, experiential, and digitally mediated learning models. Italian partners have been central to the co-design of online training materials, the implementation of collaborative digital hubs, and the development of interdisciplinary curricula that foster both entrepreneurial mindset and digital literacy (Secundo et al., 2020; VEHUB4YOU Consortium, 2024). The approach draws on the experience of Contamination Labs (CLabs), which have been recognized as a national best practice for promoting knowledge contamination across disciplines and stakeholder groups (Secundo et al., 2020). Empirical research on CLabs highlights the importance of stakeholder engagement - students, faculty, companies, and institutions - in fostering opportunity recognition, open innovation, and the co-creation of entrepreneurial projects (Secundo et al., 2020).

Equity, Inclusion, and Territorial Impact

VEHUB4YOU's Italian pilots have been particularly attentive to the persistent digital and mobility divides that affect southern regions, rural areas, and disadvantaged youth (OECD, 2022). By leveraging virtual exchanges and digital hubs, the project has enabled students who would otherwise be excluded from international experiences to access high-quality entrepreneurial education and transnational peer collaboration (Cinganotto & Pagano, 2022; Beelen & Jones, 2015). This focus on equity and inclusion is in line with both national priorities and the European Union's emphasis on social cohesion and digital citizenship (European Commission, 2021; OECD, 2022).

Institutional Learning, Policy Transfer, and Systemic Change

Italy's involvement in VEHUB4YOU has also facilitated institutional learning and policy transfer, as Italian educators and administrators have engaged in cross-national collaboration, shared evaluation frameworks, and professional learning communities (Bocconi et al., 2022; Moberg et al., 2014). The project has contributed to the dissemination of digital and entrepreneurial pedagogies at scale, supporting the professional development of teachers and the mainstreaming of innovative practices (Baroni et al., 2019; VEHUB4YOU Consortium, 2024). This aligns with the literature

on the need for systemic integration and capacity-building in entrepreneurship education (Fayolle et al., 2006; Moberg et al., 2014).

Comparative Literature Perspective

Compared to other European contexts, the Italian approach in VEHUB4YOU stands out for its focus on interdisciplinarity, stakeholder engagement, and the attempt to bridge the gap between policy and classroom practice through digital innovation (Secundo et al., 2020). However, literature also highlights persistent weaknesses: the adoption of digital technologies in Italian entrepreneurship centers is still uneven and often limited to communication rather than deep pedagogical transformation (Secundo et al., 2020). The challenge of impact evaluation - how to measure entrepreneurial outcomes and transversal competences - remains a critical issue, as noted in both Italian and international studies (Moberg et al., 2014; Fayolle et al., 2006).

Challenges and Future Directions

Despite notable achievements, several challenges remain for the institutionalization and sustainability of virtual entrepreneurial hubs in Italy. These include the need for ongoing investment in digital infrastructure, more robust teacher training in digital and entrepreneurial pedagogy, and the development of standardized assessment and certification systems for competences acquired in virtual environments (Helm, 2020; Baroni et al., 2019; European Commission, 2021). The VEHUB4YOU experience suggests that the future of entrepreneurial education in Italy will depend on the ability to scale up successful pilots, embed them in policy frameworks, and foster a culture of innovation and inclusion across the educational system (OECD, 2022; VEHUB4YOU Consortium, 2024).

Challenges and Opportunities in Implementing Virtual Entrepreneurial Hubs

The implementation of virtual entrepreneurial hubs in Italy, as exemplified by the VEHUB4YOU project, must be critically analyzed within the broader context of digital transformation, educational reform, and persistent structural asymmetries that characterize the Italian education system. While virtual hubs are increasingly

recognized as strategic levers for democratizing access to entrepreneurial learning and fostering innovation, their institutionalization is confronted by a constellation of intertwined challenges - technological, pedagogical, organizational, and cultural - whose resolution is essential for systemic impact and sustainability (OECD, 2022; Cedefop, 2022).

Digital Infrastructure and the Persistence of the Digital Divide

Despite significant policy investments - most notably through the National Recovery and Resilience Plan (PNRR) and the EU Digital Education Action Plan - Italy continues to exhibit pronounced digital divides along regional, socio-economic, and urban-rural lines (OECD, 2022). These disparities manifest not only in terms of broadband access and device availability, but also in the uneven distribution of digital literacy and institutional capacity to support technology-enhanced learning (Livingstone & Helsper, 2007; Bocconi et al., 2022). The literature confirms that digital exclusion is a multidimensional phenomenon, encompassing infrastructural, pedagogical, and cultural barriers that disproportionately affect students in the South, in rural areas, and from disadvantaged backgrounds (OECD, 2022; Cinganotto & Pagano, 2022).

The sustainability of virtual entrepreneurial hubs, therefore, depends on targeted and context-sensitive investment in digital infrastructure, as well as on the capacity of schools and universities to provide ongoing technical support and equitable access to digital resources (European Commission, 2021; TogetherLearning, 2024). Without such measures, there is a risk that virtual hubs may inadvertently reinforce existing inequalities rather than mitigate them.

Pedagogical Readiness and Teacher Professional Development

The transition from traditional, transmissive models to experiential, collaborative, and entrepreneurial pedagogies remains a major challenge in the Italian context (Lackéus, 2015; Kolb, 1984). Although the EntreComp framework has been formally adopted as a curricular reference, its integration into teacher education and professional development is still limited and uneven (Moberg et al., 2014; Bocconi et al., 2022). Empirical studies highlight that most Italian teachers have not received systematic

training in digital or entrepreneurial pedagogy, resulting in an implementation gap between policy aspirations and classroom realities (Baroni et al., 2019; Helm, 2020).

The literature emphasizes the importance of professional learning communities, cross-national collaboration, and project-based training (such as those piloted in VEHUB4YOU) as scalable models for upskilling educators and embedding transformative practices (Slaouti & Motteram, 2020; Bocconi et al., 2022). However, the mainstreaming of such models requires institutional incentives, time allocation, and recognition of the complex, reflexive role of teachers as facilitators of entrepreneurial learning (Ruskovaara & Pihkala, 2015).

Institutional Fragmentation and Governance Complexity

Governance in Italian entrepreneurship education is characterized by fragmentation, with responsibilities distributed among ministries, regions, and individual institutions (Fayolle et al., 2006; Beelen & Jones, 2015). This fragmentation leads to resource disparities, inconsistent objectives, and a lack of unified impact assessment systems. While islands of excellence exist - especially in technical schools and regional innovation hubs - there is no overarching national framework to ensure coherence, scalability, and sustainability (Moberg et al., 2014; OECD, 2022).

The VEHUB4YOU project's collaborative governance and evidence-based evaluation frameworks offer a prototype for more integrated and scalable approaches. However, their institutionalization requires policy alignment, stable funding, and cross-sectoral partnerships, in line with recent recommendations from comparative policy research (Fayolle et al., 2006; OECD, 2022).

Evaluation, Impact Assessment, and the Evidence Gap

A recurring challenge in the literature is the lack of robust, standardized systems for evaluating the impact of virtual entrepreneurial hubs. Most initiatives rely on output indicators (e.g., number of participants, hours of training) rather than on robust measures of competence acquisition, entrepreneurial intention, or long-term outcomes (Moberg et al., 2014; Fayolle et al., 2006). The ASTEE project and subsequent research advocate for mixed-method, longitudinal, and participatory evaluation models that can

capture both cognitive and affective dimensions of entrepreneurial learning (Salas et al., 2012; Mezirow, 1997).

The VEHUB4YOU project has piloted a multi-level evaluation framework, including digital analytics, participant surveys, and follow-up interviews, but the challenge remains to institutionalize such practices and align them with national and European standards (VEHUB4YOU Consortium, 2024; European Commission, 2021).

Cultural Attitudes and the Reframing of Entrepreneurship

Cultural perceptions of entrepreneurship in Italy often remain anchored to traditional, profit-oriented models, rather than recognizing its broader value for agency, creativity, and civic engagement (Neck & Greene, 2011; Lackéus, 2015). This restricts the appeal of entrepreneurship education, particularly among students in non-economic fields, women, and underrepresented groups. The VEHUB4YOU project, consistent with European trends, seeks to reframe entrepreneurship as a collective, co-creative, and socially innovative process (European Commission, 2021; OECD, 2022). However, this reframing requires systemic support through educational reform, institutional storytelling, and policy discourse (Gibb, 2002; Ratten & Usmanij, 2021).

Opportunities for Systemic Transformation

Despite these persistent challenges, the Italian context is marked by significant opportunities for systemic transformation. The convergence of policy momentum (PNRR, EU Digital Education Action Plan), increased funding, and the expansion of professional networks creates fertile ground for innovation. VEHUB4YOU demonstrates how virtual entrepreneurial hubs can serve as laboratories for governance innovation, digital inclusion, and pedagogical renewal (Secundo et al., 2020; VEHUB4YOU Consortium, 2024).

Comparative studies show that, while Italy shares many challenges with other European countries - such as digital divides and teacher training gaps - it is distinguished by pronounced regional disparities and a slower pace of systemic reform, balanced by strong engagement in European projects and innovative pilots (OECD, 2022; Cinganotto & Pagano, 2022).

Policy and Research Recommendations

- **Targeted investment** in digital infrastructure and digital literacy, especially in disadvantaged regions, is essential to ensure equitable access to virtual hubs (OECD, 2022).

- **Systematic integration** of entrepreneurial competencies in teacher education and continuous professional development, using frameworks such as EntreComp, is necessary for sustainable pedagogical transformation (Bocconi et al., 2022; Moberg et al., 2014).

- **Development of unified governance and evaluation frameworks** will ensure coherence, scalability, and sustainability across regions and education levels (Fayolle et al., 2006; European Commission, 2021).

- **Promotion of inclusive narratives** of entrepreneurship, emphasizing social innovation, civic engagement, and diversity, is required to broaden participation and impact (Neck & Greene, 2011; Lackéus, 2015).

- **Scaling of best practices** from VEHUB4YOU and similar projects should occur through policy mainstreaming, cross-sectoral partnerships, and robust dissemination strategies (VEHUB4YOU Consortium, 2024).

Concluding Perspective

The successful implementation of virtual entrepreneurial hubs in Italy will depend on the capacity to address these structural, pedagogical, institutional, and cultural challenges while leveraging emerging policy opportunities to foster an inclusive, innovative, and sustainable entrepreneurial education ecosystem. Future research should focus on longitudinal impact studies, the role of digital and hybrid pedagogies, and the institutional conditions for scaling and sustaining virtual hubs, in line with international best practices and the evolving European policy landscape (Mezirow, 1997; Salas et al., 2012; Secundo et al., 2020).

The Italian case study, as articulated in this chapter, offers a nuanced lens through which to examine the evolving landscape of entrepreneurship education in the digital era. The interplay between national reforms, European policy drivers, and the catalytic effect of international projects such as VEHUB4YOU has produced a complex

ecosystem where innovation, inclusion, and persistent structural barriers coexist (Bacigalupo et al., 2016; OECD, 2019; Cedefop, 2022).

Synthesis of Key Findings

The systematic integration of the EntreComp framework, the expansion of project-based and experiential pedagogies, and the mainstreaming of virtual exchanges - especially through eTwinning, Erasmus+ Virtual Exchange, and VEHUB4YOU - have collectively advanced Italy's capacity to foster entrepreneurial mindsets and digital competences among youth (European Commission, 2021; INDIRE, 2022). Empirical evidence demonstrates that these initiatives have not only broadened access to entrepreneurial learning but have also contributed to the internationalization of education at home, mitigating some of the traditional barriers associated with physical mobility and regional disparities (Beelen & Jones, 2015; Cinganotto & Pagano, 2022).

However, the literature and project data converge on several persistent challenges:

- **Digital and territorial divides** remain salient, with significant gaps in infrastructure, skills, and opportunities between regions and socio-economic groups (OECD, 2022).

- **Teacher professional development** in digital and entrepreneurial pedagogies is insufficiently systemic, resulting in implementation gaps between policy and practice (Bocconi et al., 2022; Baroni et al., 2019).

- **Institutional fragmentation and evaluation deficits** hinder the scalability and sustainability of innovative practices, underscoring the need for unified governance and robust impact assessment frameworks (Fayolle et al., 2006; Moberg et al., 2014).

- **Cultural attitudes** continue to frame entrepreneurship narrowly as a business or vocational pursuit, rather than as a transversal competence for civic engagement and social innovation (Neck & Greene, 2011; Lackéus, 2015).

Comparative and Theoretical Perspectives

Recent systematic and bibliometric reviews confirm that these challenges are not unique to Italy but are emblematic of broader trends in entrepreneurship education globally (Hägg, 2022; Judijanto et al., 2024; Marsinah et al., 2024). The literature

highlights the need for interdisciplinary approaches, the integration of technology and digital pedagogies, and the development of inclusive programs tailored to diverse learner profiles (Secundo et al., 2020; Ratten & Jones, 2021). Furthermore, the evolution of academic entrepreneurship ecosystems underscores the importance of higher education institutions as both drivers and beneficiaries of regional and national innovation (Stolze & Sailer, 2021).

Future Research and Policy Directions

Building on these insights, several trajectories emerge as critical for the future of entrepreneurship education and virtual business hubs in Italy and beyond:

1. **Epistemological and Pedagogical Innovation:** There is a pressing need to move beyond traditional, discipline-bound models toward interdisciplinary, dialogic, and transformative pedagogies that foreground social innovation, civic agency, and global interdependence (Lackéus, 2015; Gibb, 2002; Hägg, 2022). This entails reconceptualizing entrepreneurship as a process of sense-making and value creation within complex socio-technical systems (Neck & Greene, 2011; Sarasvathy, 2001).

2. **Institutional Embedding and Ecosystem Integration:** The sustainability and scalability of virtual entrepreneurial hubs depend on their institutionalization within governance, funding, and evaluation frameworks at both national and transnational levels (Moberg et al., 2014; OECD, 2022). Policy integration should prioritize cross-sectoral partnerships, stable resource allocation, and the mainstreaming of best practices from pilot initiatives such as VEHUB4YOU (VEHUB4YOU Consortium, 2024).

3. **Digital Transformation and Technological Innovation:** The digital transformation of entrepreneurship education must be accompanied by investments in infrastructure, digital literacy, and the adoption of emerging technologies (e.g., XR, AI, data analytics) to enhance flexibility, interactivity, and personalization in learning environments (Secundo et al., 2021; Stankovic et al., 2021; Bulto et al., 2025). High-quality digital infrastructure is foundational for equitable access and the identification of new opportunities and innovations (Stankovic et al., 2021; Fahmi & Savira, 2021).

4. **Evaluation and Reflexive Research:** Future research should employ longitudinal, mixed-method, and participatory evaluation frameworks to capture the multifaceted impacts of entrepreneurship education - cognitive, affective, social, and economic (Fayolle et al., 2006; Salas et al., 2012; Mezirow, 1997). Bibliometric and network analyses reveal the value of interdisciplinary and cross-national collaboration in advancing the field (Judijanto et al., 2024).

5. **Inclusive Narratives and Social Value:** There is a growing consensus on the need to promote narratives of entrepreneurship that emphasize diversity, gender equality, social innovation, and civic engagement, moving beyond narrow economic or commercial framings (Hägg, 2022; Ratten & Usmanij, 2021; Marsinah et al., 2024).

In conclusion, the Italian experience within VEHUB4YOU exemplifies both the opportunities and contradictions inherent in the digital transformation of entrepreneurship education. While significant progress has been made in aligning national policy with European frameworks, fostering pedagogical innovation, and expanding access through virtual exchanges, enduring structural and cultural barriers must be addressed to realize the full potential of entrepreneurial learning ecosystems (Bacigalupo et al., 2016; OECD, 2022; VEHUB4YOU Consortium, 2024).

The future of entrepreneurship education will depend on the capacity of institutions, policymakers, and educators to orchestrate integration across technology, pedagogy, and governance, ensuring that all young people - regardless of background - can develop the entrepreneurial competencies required to navigate and shape an increasingly complex and interconnected world (Secundo et al., 2020; Hägg, 2022).

4.2. Entrepreneurship learning in Ukraine

Over the last decade, the educational paradigm in Ukraine has undergone radical changes, shifting from a traditional, knowledge-oriented model to a competence-based approach, where entrepreneurship is recognized as one of the key transversal skills for life and professional fulfillment. This transformation is a response to complex challenges: on one hand, global trends demanding innovation, flexibility, and digital

literacy, and on the other, internal processes of European integration and a societal demand for modernization.

In the Ukrainian context, entrepreneurship education has acquired a much broader meaning than simply preparing individuals to run a business. It is viewed as a fundamental tool for fostering a proactive civic stance, the ability for self-realization, critical thinking, and responsibility - qualities that are critically important for the resilience of society and the future reconstruction of the country.

The full-scale invasion in 2022 was not only a geopolitical and humanitarian shock but also a catalyst for profound transformations, particularly in education. In the face of physical infrastructure destruction, mass displacement of the population, and constant security threats, traditional educational models proved vulnerable. At the same time, it was during this period that the understanding crystallized that *entrepreneurial spirit* - as the ability to see opportunities, mobilize resources, and act under uncertainty - is a key competence for the survival and resilience of the nation (Smachylo, 2023).

Against this backdrop, the role of entrepreneurship education has changed dramatically, becoming a strategic imperative for the *formation of human capital* capability of ensuring the country's reconstruction. However, the implementation of this task faces a dual challenge: the legacy of previous eras, characterized by fragmented policies and slow adaptation to modern pedagogical models (Kravchyna, 2023), and the severe constraints imposed by the war (Eurydice, 2025).

It is in this context that international projects, such as Junior Achievement, USAID, and Erasmus+ programs that utilize digital collaboration tools, have gained exceptional importance. They provide methodological, financial, and institutional support, helping to implement the world's best practices. This chapter aims to analyze the Ukrainian experience by examining the interplay of state policies, educational models, and practical initiatives, as well as the challenges and opportunities that shape its future.

The Erasmus+ project **VEHUB4YOU (Virtual Youth Business Hubs)** is a prime example of such an initiative. Its model, based on creating a network of virtual business hubs and using business simulations, serves as a prototype for a new educational

paradigm for Ukraine - flexible, internationalized, practice-oriented, and resilient to external shocks. This chapter aims to conduct a comprehensive analysis of the entrepreneurship education ecosystem in Ukraine through the prism of the VEHUB4YOU project, which will allow for a deeper understanding of the challenges and future vectors of its development.

Global Evolution: From Education for Business to Education Through Entrepreneurship

The international scholarly discourse on entrepreneurship education can be broadly divided into three main paradigms:

1. **The Small Business and Management Paradigm (1970s–1980s).** In its initial stage, entrepreneurship education was equated with training for creating and managing a small business. The main goal was to transfer functional knowledge: business planning, financial management, marketing (Shapero, A., & Sokol, L., 1982; Drucker, P. F., 1985).

2. **The Enterprise Paradigm (late 1980s–2000s).** A revolutionary shift occurred thanks to the work of European scholars, notably Allan Gibb, who proposed distinguishing between entrepreneurship (business creation) and enterprise (a broader set of behavioral attributes) (Gibb, 2002). The goal of education became learning for an enterprising life, and the focus shifted to developing a mindset.

3. **The Competencies and Value Creation Paradigm (2000s–present).** The modern paradigm views entrepreneurship as a transversal competence, crystallized in the European Framework EntreComp (Bacigalupo et al., 2016). The key idea is *learning through entrepreneurship* (Neck et al., 2014). This approach is based on modern theories such as *effectuation* (Sarasvathy, 2001), which focuses on acting with available resources under uncertainty, and *creation* (Neck & Greene, 2011), which views entrepreneurship as a creative process.

The Ukrainian Path: From Economic Necessity to European Integration

The evolution of the concept of entrepreneurship in Ukrainian scholarly thought has deep historical and cultural roots that significantly distinguish it from classic

Western economic theories. While the works of Schumpeter (1934) emphasized the role of the entrepreneur as an innovator engaged in creative destruction, and F. Knight (1921) viewed it through the prism of risk-bearing and overcoming uncertainty, the Ukrainian scholarly position has historically leaned towards actualizing the potential inherent in the individual (Kovalenko, 2020). This approach is grounded in a national tradition that relies on the values of free labor, economic independence, and personal responsibility, which have been asserted throughout the formation of the Ukrainian nation.

This cultural rootedness explains why entrepreneurship in Ukraine is perceived not only as a functional economic activity but also as a form of self-realization and assertion of personal freedom. This feature is reflected in contemporary sociological data: a 2023 study by the Rating group showed that 73% of Ukrainian youth prefer self-employment and owning their own business, whereas in EU countries this figure is only 39%. Such a significant gap indicates that high entrepreneurial aspirations in Ukraine are not just a pragmatic economic choice, but deeply resonate with the national value system, positioning entrepreneurship as an act of personal and, in a sense, national self-determination.

Contemporary Ukrainian scholars continue to develop this human-centric approach. Entrepreneurship is interpreted as a multifaceted phenomenon: as an economic category reflecting the relationships between business entities; as a method of management involving the effective use of production factors; and as a special type of economic thinking based on initiative and innovation. A significant contribution to the theory was made by Z. Varnaliy (2006), who defines entrepreneurship as a special type of management where the key figure is the entrepreneur who rationally combines production factors on an innovative basis and under their own responsibility, organizes and manages production with the aim of obtaining entrepreneurial income (p. 25).

Over the past decades, an important conceptual shift has occurred in Ukrainian academic and educational discourse - from understanding entrepreneurship exclusively as an economic activity to treating it as a key educational competence. This concept was first officially established in the Ukrainian educational environment within the

UNDP project Educational Policy and Education (United Nations Development Programme [UNDP], 2003). This process was largely influenced by European educational frameworks, particularly the Recommendations of the European Parliament and the Council of Europe and the EntreComp framework, which define entrepreneurial competence as transversal, meaning it applies to all spheres of human life, not just business.

Modern Ukrainian researchers offer various definitions of this concept. For example, H. Nazarenko (2018) views its formation as a dynamic process that involves the individual's mastery of relevant knowledge, which forms the basis for the development of entrepreneurial consciousness and behavior. Importantly, this competence has been officially included in the professional standard for teachers, where it is defined as the ability for creative search, self-presentation, and career management, indicating its recognition at the state level.

Historically, Ukrainian scholarly thought has emphasized not only the profit-making function but also the *innovative and managerial role of the entrepreneur's personality*, forming a unique human-centric approach. However, with the collapse of the USSR, this tradition temporarily faded, and the stage of **Post-Soviet Adaptation (1990s–early 2000s)** began. After gaining independence, entrepreneurship education emerged as an urgent response to the pressing need for personnel for a market economy, almost entirely following the first global paradigm of Small Business and Management.

Subsequently, as the economy stabilized, the stage of **Gradual Diversification (mid-2000s–2014)** began. At this stage, Ukrainian scholars started to move beyond a purely functional approach, actively integrating Western concepts. The scientific discourse began to feature ideas about the importance of psychological aspects and the personal qualities of an entrepreneur, which partially refocused on the national human-centric tradition.

A decisive turning point was the stage of **Systemic Convergence (2014–present)**, where the course towards European integration acted as a catalyst for the full synchronization of the educational discourse with the European one. This stage is

characterized not just by discussion but by the official recognition of the **competence-based approach**. This was expressed in the active adaptation of the European framework **EntreComp** (Diia.Business, n.d.), the spread of practice-oriented learning models (JA Ukraine, n.d.), and, importantly, the emergence of a new focus on sustainability and the social significance of business in the context of war (Shevchenko et al., 2025; Smachylo, 2023).

Despite this progressive enshrinement of **entrepreneurial competence** in educational policies and standards, its practical development in educational institutions faces a number of systemic problems. Researchers highlight the lack of curricula adapted to modern realities, a weak link between theory and practice, limited resources, insufficient teacher qualifications, and the absence of an entrepreneurial culture within the educational environment itself (Kovalenko & Tkachuk, 2021). This situation creates a significant **implementation gap:** a progressive policy aligned with European norms exists, but its implementation on the ground is ineffective. As a result, a generation is being formed that is culturally and aspirationally ready for entrepreneurship, but institutionally and pedagogically unprepared for it, which turns a potential national asset into a source of social frustration.

Thus, modern Ukrainian scholarly thought has not only caught up with global trends but has fully integrated into the third, competence-based paradigm, while enriching it with the unique national context of resilience and future post-war reconstruction. Table 4.3 summarizes the key aspects of convergence and historical differences in views on entrepreneurship education.

The National Landscape of Entrepreneurship Education

The development of entrepreneurship education in Ukraine is a complex, multi-layered process. It reflects the general trends of educational reforms but is also characterized by significant fragmentation, uneven implementation, and dependence on the initiatives of individual stakeholders. Although entrepreneurship and financial

literacy are declared as transversal competencies in state standards, their systemic integration remains incomplete.

Table 4.3. Convergence and Differences in the Concepts of Entrepreneurship Education

Parameter	Common Features (Convergence of Modern Views)	Differences (Historical and Contextual)
Goal of Education	Development of a transversal entrepreneurial competence for personal and professional fulfillment in all spheres of life.	Historically: A narrow goal of preparing business owners (especially in the early Ukrainian model).
Target Audience	All levels of education (from primary school to lifelong learning), students of all specializations.	Historically: Primarily students of business schools and economic faculties.
Key Focus	Development of a mindset, proactivity, creativity, and the ability to create value (economic, social, cultural).	Historically: Accumulation of functional knowledge (business planning, finance, marketing).
Pedagogical Approach	Learning-by-doing, project-based work, experiential and collaborative learning.	Historically: Theoretical, lecture-based instruction, focus on transmitting knowledge from teacher to student.
Role of the Teacher	Facilitator, coach, mentor who creates an educational environment and supports student initiatives.	Historically: Lecturer, expert who is the main source of information.
Contextual Specificity	Recognition of the importance of adapting to local conditions and ecosystems.	Modern Ukrainian Specificity: A strong emphasis on the role of entrepreneurship for *resilience, reconstruction, social adaptation* (veteran entrepreneurship, IDP business), and *national security*.

Entrepreneurship education in Ukraine, Italy, and Latvia demonstrates diverse approaches to integration into national education systems, reflecting differences in state priorities, economic conditions, and historical context. While Latvia and Italy, as EU members, follow general European recommendations, Ukraine, being in the process of European integration and large-scale economic transformations, is actively developing its own model of entrepreneurship support, often with an emphasis on rapid and practical solutions.

Ukraine is characterized by a dynamic yet somewhat fragmented development of entrepreneurship education. A significant impetus is provided by numerous state and private initiatives, particularly grant programs for veterans and young entrepreneurs, as well as educational projects on the Diia.Osvita platform. The key institutions are universities offering relevant specializations, and various business incubators and accelerators. The main focus is on developing practical skills for a quick business start.

Italy does not have a single national strategy for the development of entrepreneurship education. However, the country is actively implementing the European Entrepreneurship Competence Framework (EntreComp) at various levels of education. Entrepreneurial learning is integrated into both school programs and university courses (University of Foggia), especially in the fields of economics and management. University incubators and the state agency Invitalia, which offers financing for young and female entrepreneurs, play a significant role in supporting student startups.

Latvia positions itself as one of Europe's startup hubs, which is reflected in its education system. The country emphasizes the development of an entrepreneurial mindset from an early age. Universities, such as the RISEBA University of Applied Sciences, offer specialized master's programs in entrepreneurship and management. There are powerful support programs, such as UniLab, which brings together leading universities to assist student tech teams, as well as state support through innovation grants.

However, unlike many EU countries, Ukraine has not yet formed a single, coherent national strategy for the development of entrepreneurship education.

Its elements are integrated into a number of framework and sectoral documents, creating a picture more of a patchwork quilt than a seamless fabric:

Table 4.4 National Models for Stimulating Entrepreneurial Activity: A Comparative Overview (Ukraine, Italy, Latvia)

Aspect	Ukraine	Italy	Latvia
National Strategy	Developing, focused on rapid response to economic challenges and labor market needs, particularly through grant programs.	No single strategy, but the EntreComp framework is actively implemented at the national level.	Integrated into the overall economic development strategy with a focus on innovation and technology startups.
Integration in Education	Primarily at the higher education level and through extracurricular initiatives, online courses (e.g., Diia.Osvita).	Integration at the secondary and higher education levels, often as part of broader economic and management disciplines.	Active integration at all levels of education to foster an entrepreneurial culture. Specialized programs exist.
Key Institutions	Universities, Ministry of Digital Transformation, Office for Entrepreneurship and Export Development, business incubators.	Universities, Ministry of Enterprises and Made in Italy, national development agency Invitalia, startup hubs.	Universities (notably Riga Technical University), Ministry of Defence (for defense startups), innovation centers, UniLab.
State Support	Grants (Vlasna Sprava, for veterans), preferential loans, educational courses.	Financing through programs like Resto al Sud and Smart&Start Italia, support for micro and small enterprises, investment incentives.	Innovation grants for students, pre-acceleration programs (UniLab Elevate), support for defense technologies, a favorable business environment.
Focus of Learning	Practical skills for starting and running a business, digital literacy, management.	Development of entrepreneurial competencies, innovation management, small business management.	Technology entrepreneurship, innovation, development of an entrepreneurial mindset, international business.

- **The Law of Ukraine On Education (2017):** This fundamental document established the competence-based approach, defining initiative and entrepreneurship as one of the ten key competencies a graduate should possess. This created a legitimate basis for further reforms.

- **The New Ukrainian School (NUS) Concept:** For primary and basic secondary education, the NUS concept provides for the development of skills to

generate ideas, make informed decisions, cooperate effectively in a team, and take responsibility, which are components of an entrepreneurial mindset.

- **The National Qualifications Framework (NQF):** The harmonization of the NQF with the European framework facilitates the recognition of skills acquired not only through formal but also through non-formal and informal education, which is important for legitimizing various entrepreneurial courses and trainings.

- **Adaptation of EntreComp:** Ukraine has actively joined the implementation of EntreComp. On the initiative of the Ministry of Digital Transformation and the Office for Entrepreneurship and Export Development, an adapted version called EntreComp+ was created, which takes into account the specific challenges for Ukrainian business in wartime, such as risk management, cybersecurity, and entering international markets.

Despite these important steps, state policy remains largely declarative. There is no single coordinating body, which leads to a dispersion of efforts among the Ministry of Education and Science, the Ministry of Digital Transformation, and others.

Implementation in School and Vocational Education

At the level of general secondary education, the most systemic project is the activity of the non-governmental organization **Junior Achievement Ukraine (JA Ukraine)**. Their flagship program, **Company,** approved by the Ministry of Education and Science, is an example of immersive, project-based education. Students aged 15–18 do not just study theory but create real mini-companies, going through the full business cycle: from brainstorming and market research to attracting micro-investments, production, marketing, and financial reporting. In the 2022-2023 academic year, despite the war, over 300 students participated in the program, founding 40 mini-companies and receiving support from specially trained teachers and mentors from the business community.

In the field of vocational education and training (VET), the development of entrepreneurship has been recognized as a strategic priority. This is due to the understanding that VET graduates are a key force for rebuilding infrastructure and

developing local economies. The international project **Integration of Entrepreneurship Education into the VET System of Ukraine,** implemented with the support of Estonia (ESTDEV), is a clear example of such work. The project introduces the Estonian model of entrepreneurial learning, which includes ready-made training modules, methodologies for teachers, and the development of entrepreneurial skills as a mandatory component of training for skilled workers.

Higher Education and the Concept of the Entrepreneurial University

In Ukrainian universities, entrepreneurship education has long been the prerogative of economic faculties. However, in recent years, there has been a movement towards the model of the **entrepreneurial university»** an institution that actively commercializes research, fosters innovation, and integrates an entrepreneurial spirit into all areas of its activity.

Key elements of this transformation include:

- **Creation of startup incubators and accelerators:** The network of youth startup incubators **YEP**, operating at more than 10 universities, has become an important hub of innovation. It provides students from various specializations with educational programs, mentoring support from practicing entrepreneurs, and access to a community of like-minded individuals.

- **Introduction of innovative courses:** The launch of the pilot course **Innovative Entrepreneurship and Startup Project Management** was a significant step forward. This course, developed in collaboration with the Ministry of Education and Science, the Ministry of Digital Transformation, and YEP, allows students to receive academic credits (ECTS) for working on their own startup ideas, which is revolutionary for the predominantly conservative academic system.

- **Development of university-business partnerships:** Projects funded by **USAID** are aimed at establishing R&D cooperation between university research centers and private companies. This not only facilitates technology transfer but also involves students in solving real market problems, thereby developing their practical skills.

However, this movement faces serious obstacles: bureaucratic inertia, insufficient motivation of faculty to participate in innovative activities, and a lack of long-term funding for university startup ecosystems.

Table 4.5. Main Pedagogical Models and Their Application in Ukraine

Model/Approach	Key Characteristics	Examples of Application in Ukraine
Experiential Learning	Creation of real practical experience, followed by reflection and application of lessons learned.	The core of Junior Achievement programs (Company), activities of YEP university startup incubators.
Project-Based Learning	Working in interdisciplinary teams to solve specific problems, creating prototypes and projects.	Hackathons, startup competitions, the Innovative Entrepreneurship course in HEIs.
Simulation-Based Learning	Use of business games and virtual simulators to model business processes and make management decisions.	Used in management and economics courses, but its prevalence is limited due to a lack of specialized software.
Mentoring and Coaching	Involving experienced entrepreneurs and professionals for individual consulting and team support.	A key element of YEP, JA Ukraine programs, and most business incubators.
Digital/Blended Learning	Integration of online platforms (Prometheus, Coursera), digital collaboration tools, and educational resources.	Became widespread after 2020, especially during the war; used for theoretical preparation and teamwork.

Entrepreneurial Learning as a Tool for Socio-Economic Activation of Youth in Modern Ukraine

Analyzing the entrepreneurial sentiments among youth is key to understanding the potential and challenges facing the Ukrainian economy. As noted above, a sociological study by the Rating group revealed a unique social trend: **73% of Ukrainian youth aged** 15-30 declare a desire to start their own business or be self-employed, which starkly contrasts with the **39% among youth in EU countries** (Sociological Group Rating, 2023). These data indicate the presence of enormous, yet largely untapped, human capital capable of becoming a driving force for economic recovery (Sociological Group Rating, 2023).

However, a deep chasm exists between high entrepreneurial aspirations and the harsh operational reality. Young people who dare to start their own businesses face a

series of systemic barriers. Sociological studies from 2024 confirm that **corruption** consistently ranks second among the most pressing problems in society, after the armed aggression of the Russian Federation, with **79.4% of the population** considering it a very serious problem (Ilko Kucheriv Democratic Initiatives Foundation, 2024). Surveys of entrepreneurs complete this picture: among the main obstacles to doing business, they name **unpredictable state actions (50.7%)**, a lack of solvent customers (49.4%), a shortage of skilled workers (42.1%), and insufficient startup capital (33.0%) (European Business Association, 2024).

Thus, an aspiration-reality gap is formed: on one hand, millions of young Ukrainians strive for economic independence, and on the other, they face a hostile institutional environment. Existing state support tools, though important, often prove to be tactical and unable to solve systemic problems at the macro level.

A key instrument of state support for youth entrepreneurship in Ukraine is the grant program **Vlasna Sprava** (Own Business), which has a special component for young people aged 18 to 25. The program's terms provide for a micro-grant of up to **UAH 150,000**. A special feature is the absence of a strict requirement to create new jobs. At the same time, the program includes an obligation to return the grant amount in the form of paid taxes and fees within three years, which stimulates business formalization (State Employment Center, 2025).

A quantitative analysis of the program's results demonstrates its targeted but positive impact. As of February 2025, **113 young Ukrainians** have become winners, receiving a total of **UAH 16.5 million**. The range of supported projects is quite broad: among the winners are founders of creative and SMM agencies, beauty salons, coffee shops, car service stations, as well as producers of tactical accessories and entrepreneurs in the agricultural sector (State Employment Center, 2025).

Although the Vlasna Sprava program is an important step in the right direction, its scale does not yet match the scale of the entrepreneurial aspirations of Ukrainian youth.

Table 4.6. State Grant Program Vlasna Sprava for Youth (as of 2025)

Indicator	Characteristic
Target Audience	Citizens of Ukraine aged 18 to 25
Grant Amount	Up to UAH 150,000
Key Conditions	Registration as a sole proprietor after receiving the grant; return of the grant amount in the form of taxes within 3 years; no obligation to create jobs
Number of Winners	113 people
Total Funding Amount	UAH 16.5 million
Popular Business Areas	Creative services, SMM, service sector (coffee shops, cosmetology), manufacturing, agriculture

Source: Compiled based on data from the Ministry of Economy of Ukraine

Supporting 113 individuals is significant for them personally, but it cannot systemically influence a situation where millions of young people view entrepreneurship as a desirable career path. This once again underscores the need to supplement such grant instruments with systemic reforms aimed at improving the overall business climate in the country.

The Specifics of Entrepreneurial Learning as a Mechanism for Veteran Reintegration

The social and economic reintegration of veterans is one of the most acute challenges for Ukrainian society. The problem of unemployment among combatants is significant, though partially hidden. According to official data from the State Employment Center, as of September 2023, 1,700 unemployed combatants were registered (Center for Economic Strategy, 2024). However, these figures do not reflect the full picture, as many veterans face psychological and organizational barriers. In conditions where traditional employment mechanisms show limited effectiveness (only 672 combatants were employed during the same period), entrepreneurship stands out as a vital tool for reintegration (Center for Economic Strategy, 2024).

Its value lies not only in economic independence. For a person returning from the front, entrepreneurship provides an opportunity to regain control over their own life, realize leadership qualities, and make the difficult identity transition - from the role of a soldier to that of a civilian creator (Center for Economic Strategy, 2024).

At the same time, veteran entrepreneurs face the same systemic problems as other citizens, but in an exacerbated form. One such problem is the high level of the shadow economy, which, according to World Bank estimates, reached 45.4% of GDP even before the full-scale invasion (Center for Economic Strategy, 2024). The shadow market creates a trap: it offers the illusion of an easy start but deprives the entrepreneur of access to formal support tools. This creates a vicious circle that can only be broken by targeted entrepreneurship education (Center for Economic Strategy, 2024).

Evaluation of the Effectiveness of State Programs Supporting Veteran Business

To support veteran entrepreneurship, the government has introduced a special component within the eRobota program. This initiative offers veterans and their family members grants for creating or developing a business in the amounts of up to UAH 250,000 (1 job), up to UAH 500,000 (2 jobs), and up to UAH 1 million for veterans with entrepreneurial experience (4 jobs) (Ministry of Economy of Ukraine, 2025).

Statistical data indicate a significant demand for this program. Between July 2022 and 2025, decisions were made to provide 1,934 grants totaling UAH 924 million, which is expected to create 3,700 new jobs (Ministry of Economy of Ukraine, 2025). Other data specify that 1,091 grants totaling UAH 508 million were issued directly under the veteran component (Ukrainian Veterans Foundation, 2025). Analysis shows that 63% of grant recipients directed the funds to expand an existing business, while 37% used them to start a new one (Ministry of Economy of Ukraine, 2025).

Table 4.7. Performance of the eRobota Program for Veterans and Their Family Members (2022–2025)

Indicator	Value
Period	July 2022 – 2025
Number of Grants Issued	1,934
Total Funding Amount	UAH 924 million
Planned Number of Job Created	3,700
Average Grant Size	UAH 478,000
Grant Distribution	37% – new business, 63% – expanding existing business

Despite the positive dynamics, the program has a significant drawback that limits its accessibility. A key requirement for applying is the presence of a detailed business

plan. For many veterans who lack prior entrepreneurial experience or special education, this requirement becomes an insurmountable barrier (Center for Economic Strategy, 2024). An analysis of the reasons for grant rejections shows that they are often related to the low quality of business plans, unclear expected outcomes, or insufficient viability of the business idea (Ukrainian Veterans Foundation, 2025). This points to a pre-grant educational gap: a disconnect between the formal requirements of state policy and the actual competencies of the target audience. To bridge this gap, intermediate, preparatory educational programs are needed that provide mentoring support and develop business planning skills even before an application for funding is submitted.

The Role of Virtual Exchanges and Digital Transformation

Digital transformation has become a key factor in the resilience and adaptability of Ukrainian education. The forced transition to online learning has opened up new, albeit unequal, opportunities for internationalization and the development of entrepreneurial skills.

European Union programs, such as Erasmus+ Virtual Exchange, have become an important tool for internationalization at home. They provide Ukrainian youth and educators with the opportunity to participate in intercultural online projects with their European colleagues. Such exchanges directly develop soft skills»i ntercultural communication, teamwork in a digital environment, critical thinking, and problem-solving - which are integral components of modern entrepreneurial competence.

However, the main obstacle on this path remains the **deep digital divide**. Unequal access to stable, high-speed internet and modern devices, especially in rural areas, small towns, and frontline regions, creates a risk of deepening educational inequality. This means that the most vulnerable groups of young people, who have already suffered the most from the war, may be deprived of access to innovative educational opportunities, thus perpetuating social inequality.

The VEHUB4YOU project is a direct response to the challenges described. Its main goal is to develop the entrepreneurial and digital skills of youth from Ukraine, Azerbaijan, and European Union countries through a specialized virtual exchange

program. The project brings young people together to work collaboratively on creating business ideas aimed at solving social and environmental problems.

Key aspects of VEHUB4YOU's significance:

- **Practical Orientation:** Unlike traditional lecture-based courses, VEHUB4YOU offers a learning-by-doing model. Participants in international teams go through the full cycle of developing an entrepreneurial project: from idea generation and market analysis to creating a business model and presenting it.

- **Real-Time Soft Skills Development:** The project creates an environment where developing soft skills is not a theoretical task but a practical necessity. Participants learn to overcome language barriers, cultural differences, and coordinate work across different time zones, which is valuable experience for future entrepreneurs.

- **Bridging the Digital Divide:** Although the project cannot physically provide all participants with equipment, its virtual format is more accessible and inclusive compared to physical mobility programs. A flexible schedule and asynchronous work formats allow youth from regions with unstable network access to participate. Moreover, it encourages participants to master new digital collaboration tools, enhancing their digital literacy.

- **Building an International Network:** Participation in the project allows Ukrainian youth to establish valuable professional and personal connections with peers and mentors from the EU. This network can become the basis for future international startups, joint initiatives, and further integration into the European business community.

The **VEHUB4YOU** project is a vivid example of how virtual exchange tools can be effectively used to develop the entrepreneurial potential of youth in crisis conditions. It not only provides specific knowledge on developing business projects but also fosters a global mindset, adaptability, and communication skills, which are the foundation for a successful career in the 21st century.

For the Ukrainian education system and state institutions, the significance of the project is as follows:

- **A Model for Scaling:** The successful experience of VEHUB4YOU can be used as a model for creating similar national and regional programs integrated into university entrepreneurship courses.

- **A Tool for Reintegration:** Such projects can become an effective means of engaging and supporting youth from temporarily occupied territories and those living abroad, ensuring their connection with Ukraine.

- **Prioritizing Digital Inclusion:** The results and challenges of the project highlight the urgent need for state investment in bridging the digital divide, as without equal access to technology, the potential of such initiatives will remain limited.

Thus, **VEHUB4YOU** is not just an educational project but a strategic investment in Ukraine's human capital. It contributes to the formation of a new generation of Ukrainian entrepreneurs - resilient, innovative, capable of thinking globally, and ready to rebuild the country based on European values.

Conclusions and Strategic Directions for Development

Ukraine's experience demonstrates a unique model for the development of entrepreneurship education, shaped at the intersection of systemic reforms, civic activism, international support, and extreme crisis conditions. Despite the absence of a coherent national strategy, a dynamic, albeit fragmented, ecosystem has developed in the country. Its drivers are international programs (particularly Erasmus+), networks of university incubators (YEP), and accelerated digitalization catalyzed by the war.

To move from individual successful initiatives to sustainable systemic impact, it is necessary to focus on the following strategic directions:

1. **Development and Implementation of a National Strategy for Entrepreneurship Education:** Creating a single framework document based on the adapted EntreComp+ framework is critically important. The strategy should clearly distribute responsibilities among government bodies, define mechanisms for stable funding, and establish methods for monitoring and impact assessment.

2. **Systemic Training and Support for Teachers:** It is necessary to develop and implement a national standard for the professional development of educators in entrepreneurial and digital pedagogy. This should include mandatory modules in pre-service teacher training programs and the creation of an online platform with resources and a community of practice for continuous learning.

3. **Bridging the Digital Divide and Building Infrastructure:** Investing in connecting all educational institutions to high-speed internet, providing necessary devices for students and teachers from vulnerable groups, and developing national educational platforms must become a state priority.

4. **Institutionalization and Scaling of Best Practices:** Successful models, such as the VEHUB4YOU program, should not just be approved but integrated into educational standards and curricula, receiving appropriate state support for their dissemination throughout the country.

5. **Focus on Social and Inclusive Entrepreneurship:** In the context of post-war reconstruction, special attention should be paid to programs that support veteran entrepreneurship, initiatives of internally displaced persons, and projects aimed at solving acute social and environmental problems in communities.

In conclusion, building an inclusive and innovative ecosystem for entrepreneurship education is not merely an educational task but a strategic imperative for economic revival, social cohesion, and strengthening Ukraine's resilience. It is an investment in human capital capable not only of overcoming unprecedented challenges but also of actively creating an innovative and democratic future.

4.3. Fostering business skills in a rapidly developing economy

Current situation for business development in the rural sector in Azerbaijan

Following the restoration of independence, the agricultural sector of Azerbaijan, similar to other areas of the national economy, faced complex challenges during its transition period. The current progress achieved in this field is the outcome of consistent efforts and well-implemented state policies. Nowadays, Azerbaijan not only

meets domestic demand for many essential food products but also exports a wide range of agricultural goods to foreign markets (Azerbaijan.az, n.d.).

In line with modern development priorities, numerous initiatives have been implemented to advance the agricultural sector. Farmers are offered various incentives, including preferential credit opportunities that extend beyond urban entrepreneurs. By effectively utilizing these financial resources, many farmers have expanded their activities and established large-scale farms. These enterprises contribute substantially to stabilizing the domestic market, increasing export capacity, reducing import dependency, and strengthening overall food security.

In recent years, sustainable development in agriculture has been ensured alongside the growth of the non-oil sector, which plays a vital role in employment generation. Significant measures have been directed toward efficient land use and water resource management. Thousands of hectares of arable land have been cultivated and included in crop rotation, leading to stable growth in agricultural output.

To further boost the production of cotton, grains, and livestock products, large-scale infrastructure improvements have been realized in irrigation and water supply systems. The construction of new reservoirs, pumping stations, and main canals has enhanced water availability for agricultural lands, thereby supporting consistent production and higher yields.

According to the Presidential Decree №1897 dated March 16, 2016, titled On approval of the main directions of the strategic road map for the national economy and key sectors of the economy, a comprehensive analysis of the agricultural production and processing industries in Azerbaijan was conducted. This process involved the participation of relevant state institutions, research organizations, and independent experts. Based on these studies, assessments, and consultations, the Strategic Road Map for the Production and Processing of Agricultural Products in the Republic of Azerbaijan was formulated, outlining the long-term vision for the sustainable growth of the agricultural sector (The Strategic Road Map for the Production and Processing of Agricultural Products in the Republic of Azerbaijan, 2016).

To enhance management and coordination within the agricultural sector, the Agrarian Services Agency was established under the Ministry of Agriculture of the Republic of Azerbaijan. Presently, the government provides extensive support to agricultural producers through various incentive mechanisms, which include: exemption from certain taxes, provision of preferential loans, customs concessions for agricultural and processed imports, compensation of 40% of the cost of agricultural machinery and equipment sold or leased by AgroService, and payment of 50% of insurance premiums for agricultural assets and forecasted insurable events (Azerbaijan.az, n.d.).

Within the framework of the Strategic Road Maps for the National Economy and Key Sectors of the Economy, approved by the Presidential Decree dated December 6, 2016, multiple initiatives have been implemented to strengthen the agricultural business environment and regulatory base. These initiatives aim to facilitate access for small and medium-sized enterprises to domestic and foreign markets, promote innovation, support the creation of competitive sectors, and enhance food security. The measures also focus on import substitution, job creation in rural areas, and improving production facilities for agricultural producers (The Strategic Road Map for the Production and Processing of Agricultural Products in the Republic of Azerbaijan, 2016).

Furthermore, following the liberation of territories from occupation, strategic planning for agricultural development in these regions has commenced. The restoration of access to lands with key water reservoirs will significantly improve irrigation opportunities across hundreds of thousands of hectares. The liberated areas possess strong potential for viticulture, grain production, cotton growing, and livestock breeding. Effective utilization of these resources, combined with the expansion of the agro-processing industry, will contribute to the sustainable and diversified development of Azerbaijan’s agricultural sector (The Strategic Road Map for the Production and Processing of Agricultural Products in the Republic of Azerbaijan, 2016).

Measures taken to bridge the skills gap in entrepreneurship in rural business in the Republic of Azerbaijan

One of the most important factors in creating conditions for rural business is undoubtedly supporting small and medium-sized businesses (SMBs) in this area and instilling entrepreneurial skills in those who want to work in this field.

The Small and Medium Business Development Agency (KOBİA) of the Republic of Azerbaijan is a public legal entity that supports the development of small and medium businesses in Azerbaijan, provides a number of services to small and medium business entities, and coordinates and regulates the services of state bodies in this area (Small and Medium Business Development Agency of the Republic of Azerbaijan [KOBİA], n.d.).

The purpose of KOBİA is as follows:

- to participate in the regulation of the activities of small and medium-sized businesses;

- to apply a flexible management system and an effective coordination mechanism that is widely used in international practice in this area and meets modern requirements;

- to strengthen the role of small and medium-sized businesses in the country's economy, increase their specific weight and competitiveness;

- to expand access to financial resources and improve their institutional support mechanisms,

- to coordinate the activities of state and private institutions in this area;

- to create favorable conditions for the development of entrepreneurship in the regions;

- to attract local and foreign investments to this area, etc.

The mission of the KOBİA is to increase the efficiency of the small and medium business regulatory system, provide numerous support mechanisms and easy access to them for entrepreneurs, achieve sustainable development of the SMBs sector and increase its role in the country's economy (Small and Medium Business Development Agency of the Republic of Azerbaijan [KOBİA], n.d.).

One of the goals of the agency is to transform the institution into a carrier of an important mission as a friend of the entrepreneur.

In order to ensure sustainable economic development in Azerbaijan, our strategic goals are to increase the role of small and medium businesses in economic development, their share in gross domestic product and employment, strengthen competitiveness, ensure profitable and efficient access of SMBs to financing resources, ensure the provision of daily consumer goods mainly through SMBs, and expand SMBs access to foreign markets (Small and Medium Business Development Agency of the Republic of Azerbaijan [KOBİA], n.d.).

In accordance with its goals set out in the charter, KOBİA carries out its activities in the field of SMBs development in the country based on the following guiding principles:

- entrepreneur satisfaction: attaches special importance to meeting the requirements of entrepreneurs and their expectations from the organization in its activities;

- efficiency: ensures the adoption of flexible decisions on areas of activity, and a prompt response to entrepreneurs' applications;

- transparency: creates various platforms to inform the public, including the business community, about its activities;

- convenience and courtesy: creates conditions for SMBs entities to conveniently use the services provided and organized by the Agency, ensures courtesy when providing services;

- responsibility: realizes its responsibility for ensuring state interests in making decisions on areas of activity.

The structure of the Agency includes the Office of the Small and Medium Business Development Agency of the Republic of Azerbaijan; Small and Medium Business Houses and Small and Medium Business Development Centers. As Small and Medium Business Houses, Baku SMB House, Khachmaz SMB House, Yevlakh SMB House operate. As Small and Medium Business Development Centers (SMEDC), there are centers in Baku, Ganja, Sumgayit, Khachmaz, Lankaran, Sheki, Mingachevir, Yevlakh, Nakhchivan (Small and Medium Business Development Agency of the Republic of Azerbaijan [KOBİA], n.d.).

In accordance with the state policy and programs implemented in the direction of

entrepreneurship development and support for SMBs, KOBİA actively participated in the process of improving the business environment, legislation in the SMB sector and state services to business within the framework of its mandate in 2024. The Agency supported the creation of new SMB entities and the development of existing SMBs, the protection of the legitimate interests of entrepreneurs, access to markets, financial resources, knowledge and skills with various tools and mechanisms. The establishment and development of relations between local and foreign businessmen, and mutual exchange of experience in the field of SMB were emphasized. In accordance with the state policy implemented in the direction of the restoration and reconstruction of our liberated territories, ensuring sustainable settlement, and reintegration of the region into the country's economy, KOBİA is also closely participating in the process of establishing business in Karabakh, implementing a number of measures and projects in this area (Small and Medium Business Development Agency of the Republic of Azerbaijan [KOBİA], n.d.).

In 2024, in order to educate entrepreneurs in the field of SME business, increase their knowledge and skills, SMEDC included in the structure of KOBİA conducted up to 900 trainings on various topics and provided more than 11,000 hours of consulting services. A total of 9,700 SMB entities, startups and those wishing to start a business benefited from these services. In 2024, SMBs supported entrepreneurs in preparing more than 500 business plans. In 2024, with the support of SMBs, support was provided for the creation of 20 new SMB entities in the agricultural and service sectors in various regions (Small and Medium Business Development Agency of the Republic of Azerbaijan [KOBİA], n.d.).

A timeline of the above-mentioned events for 2021-2024 is provided in the following diagrams:

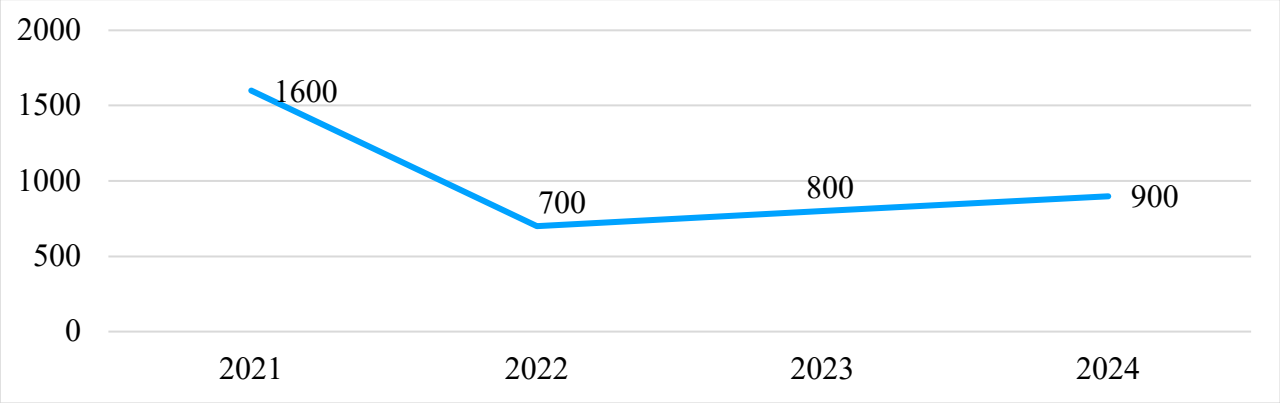

Fig. 4.1. Trainings conducted by SMEDC on various topics

Source: Prepared by the author based on data from Small and Medium Business Development Agency of the Republic of Azerbaijan

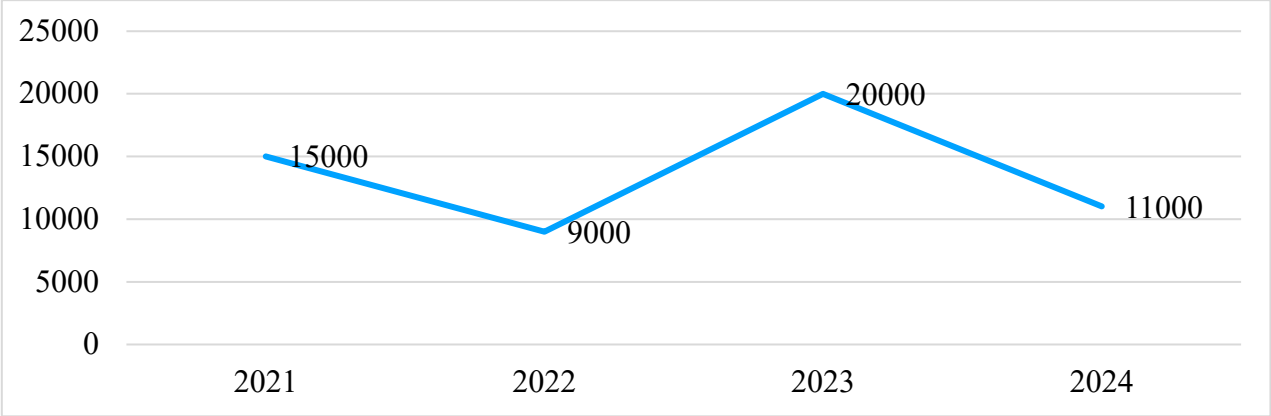

Fig.4.2. Advisory services (hours) provided by SMEDC

Source: Prepared by the author based on data from Small and Medium Business Development Agency of the Republic of Azerbaijan

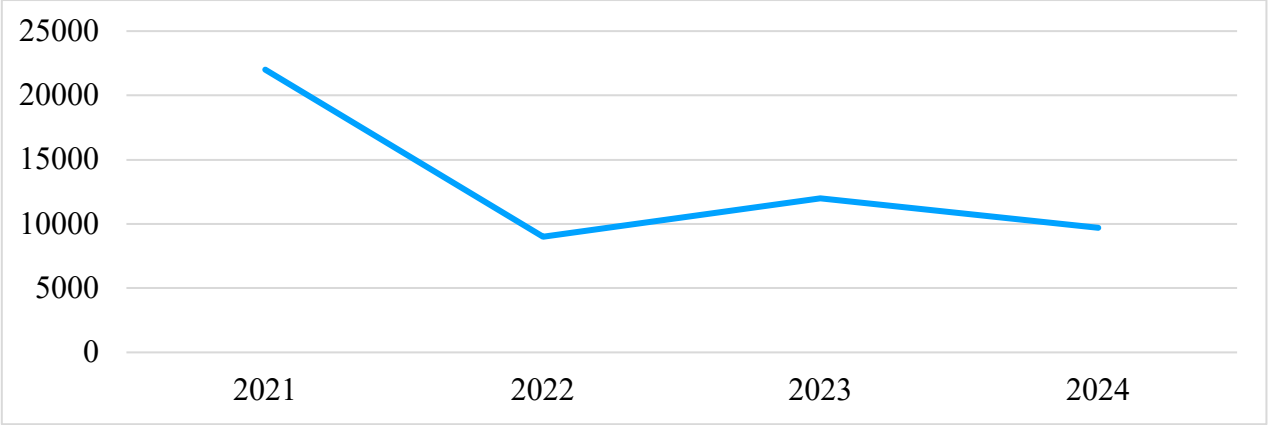

Fig.4.3. Number of SMEDC benefiting from services

Source: Prepared by the author based on data from Small and Medium Business Development Agency of the Republic of Azerbaijan

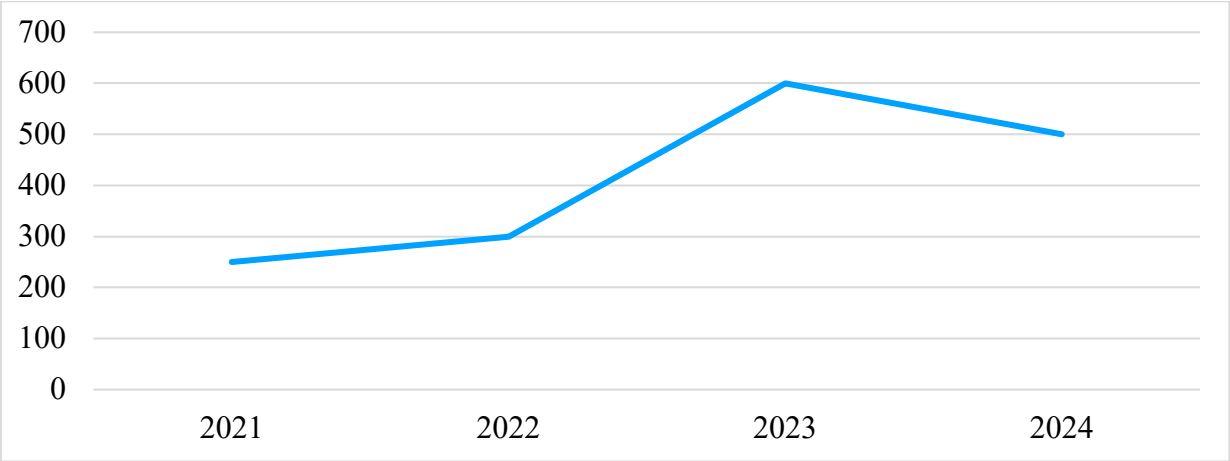

Fig.4.4. Support for entrepreneurs in preparing a business plan by SMEDC

Source: Prepared by the author based on data from Small and Medium Business Development Agency of the Republic of Azerbaijan

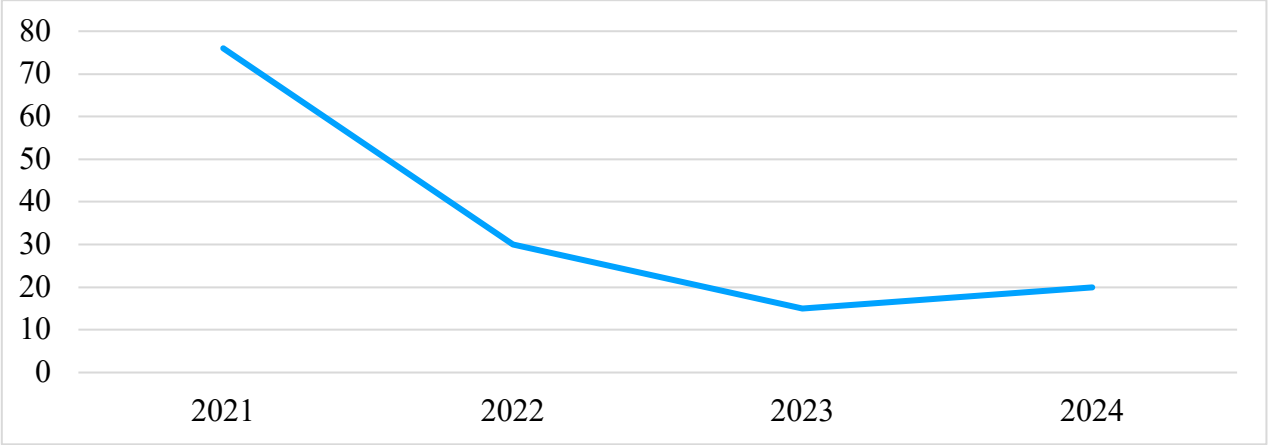

Fig. 4.5. SMBs created in the agricultural and service sectors in the regions with the support of SMEDC

Source: Prepared by the author based on data from Small and Medium Business Development Agency of the Republic of Azerbaijan

It should be noted that since 2020, SMEDC have conducted trainings in online and offline formats to increase the knowledge and skills of SMEs, those who want to start a business, and startups in the field of business, provided individual and group consulting services, and provided support in the preparation of a business plan, networking of SMBs, etc.

We wrote above that currently, SMEDC operate in 8 economic regions of the country. These centers serve not only the city in which they operate, but also the surrounding cities and regions. The trainings organized by SMEDC cover areas such

as starting a business, soft skills, project management, financial management, corporate law, sales, marketing, digital skills, green economy, social entrepreneurship, etc. SMBs can apply to SMEDC for support in accessing sales channels, consulting services on marketing, business planning, accounting, legal services and other issues. All services provided by SMEDC are free of charge. Business entities wishing to benefit from the services of SMEDC can obtain detailed information and apply through the unified online platform www.kobim.az (Small and Medium Business Development Centers, n.d.).

In 2024, the SMB Model Enterprise, established by the KOBİA at the Azerbaijan Technical University, began its activities.

The Model Enterprise is a training and practice center based on cost-effective management methods that allow small and medium-sized industrial enterprises to become efficient and competitive. The goal of the SMB Model Enterprise is not only to promote efficient and cost-effective production in enterprises, but also to expand the cost-effective transformation process by providing as many small and medium-sized business entities as possible with training and advisory support in the field of project implementation. Engineers and technical staff of SMB entities that benefit from the opportunities of the Model Enterprise learn cost-effective methods during practice and apply these methods in their companies. This increases the productivity and competitiveness of both employees and the company.

In the SMB Model Enterprise, which was created by studying international experience, it is possible to visually observe the real business process from initial planning to the establishment of the enterprise. Operating on the basis of the See, hear and do concept, the SMB Model Enterprise is equipped with the necessary equipment, which allows you to test theoretical knowledge in practice, visually see the operation of modern technological equipment, and learn methods of saving resources, time and costs in the production process. The trainers of the SMB Model Enterprise teach topics on strategies and models such as Kaizen, Six Sigma, 5S, KPI-KAI, etc., and their application is tested. In addition to entrepreneurs, students studying in relevant specialties and teachers teaching these subjects can also participate in the trainings

conducted by the Model Enterprise. All services provided to entrepreneurs by the SMB Model Enterprise are free of charge. In 2024, 144 entrepreneurs and their employees benefited from the training and practical experience opportunities of the SMB Model Enterprise. By applying the knowledge and methods they learned in the training sessions at the model enterprise to the production process, they achieved successful results, including increased productivity in production, and were able to save time and costs.

More than 100 SMBs benefited from the video training platform created by KOBİA in 2024. This platform currently contains a total of 180 training videos, each consisting of 20 topics, on the topics of starting a business, soft skills, corporate law, project management, finance, sales, marketing, tourism, and organization of the export process, presentations of training topics, relevant self-assessment tests, and information about trainers (Small and Medium Business Development Centers, n.d.). It is possible to benefit from the video trainings by registering on the website www.kobim.az. The video training platform was created on the basis of an innovative approach and modern experience in order to expand the training and education opportunities of entrepreneurs and accelerate the application of advanced practice in the business field (Fig.4.6).

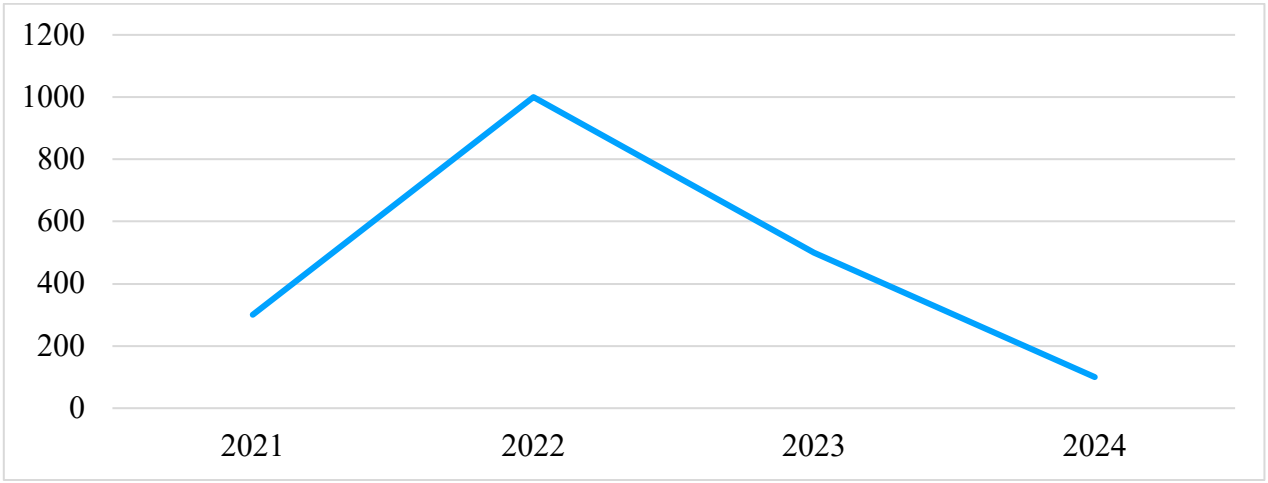

Fig.4.6. SMBs benefiting from the video training platform

Source: Prepared by the author based on data from Small and Medium Business Development Agency of the Republic of Azerbaijan

In 2024, 60 entrepreneurs and managers operating in various sectors of the economy took a professional development course in Germany within the framework of the Business Cooperation with Germany Program to gain international experience and received an international certificate.

In total, 619 entrepreneurs and managers benefited from this program between 2009 and 2024. The program, which aims to provide Azerbaijani entrepreneurs and managers with international business experience, improve their knowledge and skills, and establish direct business relationships with leading German companies, is coordinated by the KOBİA on the Azerbaijani side, and by the International Cooperation Agency (GIZ) on the German side.

One of the mechanisms for providing on-site support to KOBİA is the Small and Medium Business Friend (SMB Friend) network. The Agency's activities in the regions are carried out through this network. SMB Friends provide necessary support to business entities wishing to start a business and expand their entrepreneurial activities within the framework of existing state support mechanisms, including the Agency's services. Support for the creation of new business entities, protection of the legitimate interests of entrepreneurs and implementation of their investment initiatives are among the main areas of activity of SMB Friends. Another important area of activity of the SMB Friends network is conducting surveys and monitoring. SMB Friends, who are in close contact with entrepreneurs, learn about their development needs through surveys. At the same time, monitoring of services provided to SMBs is carried out on-site through this network. Currently, SMB Friends covers 52 cities and districts, including 54 SMB Friends offices in 14 economic regions of the country. A total of 10 coordinators and 56 SMB Friends serve entrepreneurs in these cities and districts (Fig.4.7).

In addition, in order to support those who want to engage in entrepreneurship in the agricultural sector, as well as to develop entrepreneurial skills in rural business, a strategic goal has been set in the Strategic Roadmap for the production and processing of agricultural products in the Republic of Azerbaijan in the field of Development of the system of science, education and information and advisory services in the

agricultural sector.

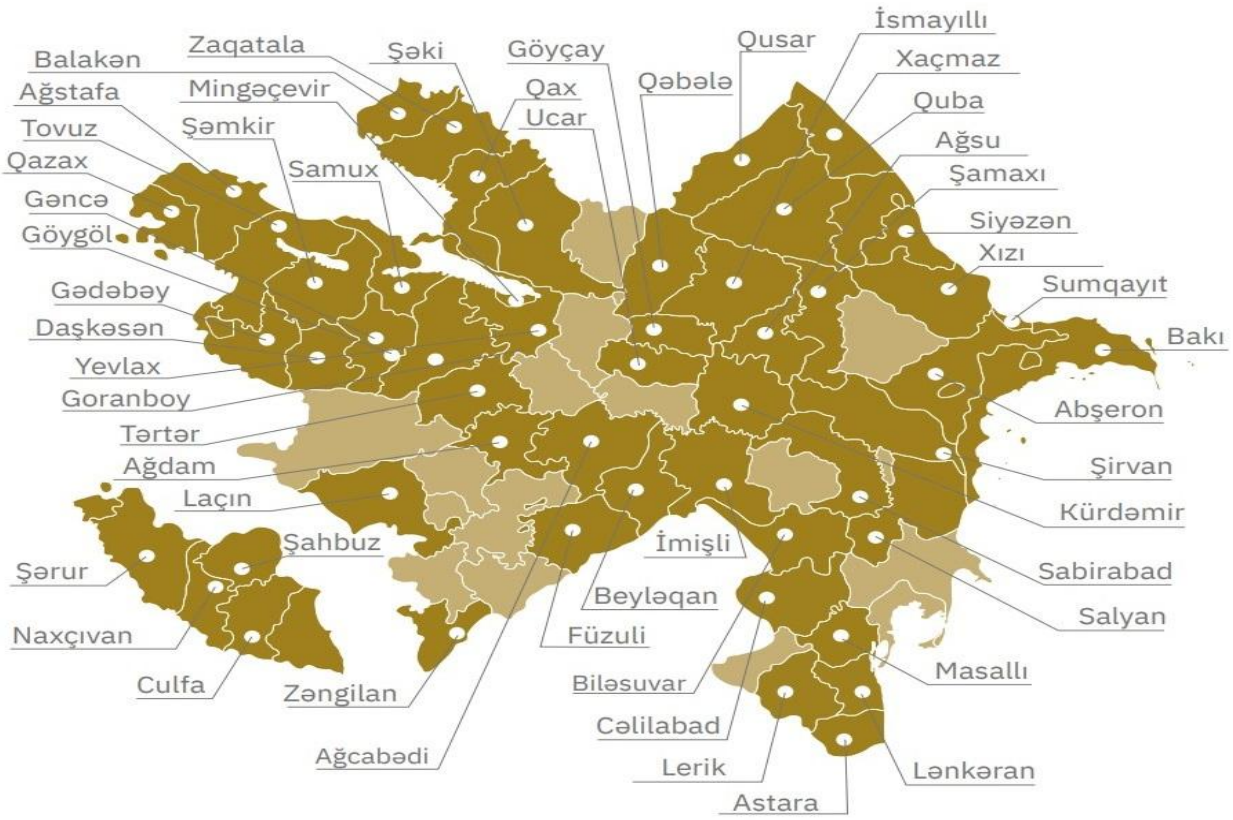

Fig.4.7. SMB Friend map serving entrepreneurs in the regions

Source: Small and Medium Business Development Agency of the Republic of Azerbaijan, n.d.

One of the three priority areas identified to achieve this strategic goal is to form an information and advisory service network that meets the needs of the agricultural sector and pay attention to the issues of transferring innovations to producers. In this direction, initially, it is planned to prepare a draft law regulating information and advisory services in the agricultural sector, improve the material and technical base of state institutions operating in this field, and carry out work to establish an electronic advisory service.

The main goal of the information and advisory services provided by the Agricultural Science and Information Advisory Center (ASIAC) and its subordinate scientific and research institutes currently operating in the country is to ensure the acquisition and transfer of knowledge and skills in the regions. However, there is a need to establish an effective system that ensures the provision of information and

advisory services to farms operating in the country. Interviews and observations show that the knowledge and skills of entrepreneurs in this area are not yet at the required level. Therefore, it is necessary to increase the knowledge and skills of agricultural producers.

It is planned to take appropriate measures to implement the strategic goal.

ASIAC will evaluate the opportunities for transferring information and advice by establishing model farms, organizing winter schools, conducting field trainings and other similar activities. It is envisaged to create a network of consultants covering the country. The Ministry of Agriculture, under the leadership of ASIAC, will assess the opportunities for creating a network of consultants by involving employees of relevant research and educational institutions, professional associations and consulting companies, as well as independent specialists, and will prepare relevant reports. A certification system will be established to assess the knowledge and skills of consultants, and if necessary, training will be provided to potential consultants. Opportunities for close cooperation with educational institutions will be evaluated in organizing trainings. An electronic database of consultants will be created across the country to improve management. In implementing the planned measure, opportunities for cooperation between ASIAC and the newly established ASAN Support to Family Business centers (ABAD centers) will be evaluated (ASAN Support to Family Business [ABAD], n.d.).

The public legal entity ABAD centers was established in 2016 under the supervision of the State Agency for Public Service and Social Innovations under the President of the Republic of Azerbaijan. The purpose of the establishment of the institution is to support the active participation of citizens in the socio-economic development of the Republic of Azerbaijan, the development of small and medium-sized entrepreneurship, increasing the employment level of the population and the formation of competitive family farms.

Currently, ABAD centers provide support to families operating in 2 priority areas: decorative and applied folk crafts and food production.

In addition to the Baku office of the public legal entity ABAD, 6 regional centers

operate:

1. Baku ABAD head office.
2. Masally ABAD regional center.
3. Balakan ABAD regional center.
4. Quba ABAD regional center.
5. Imishli ABAD regional center.
6. Shaki ABAD regional center.
7. Tovuz ABAD regional center.

Theoretical and practical trainings in crafts, jewelry, and carpet weaving are held at ABAD Schools. Announcements about their start are made on the pages of ABAD on social networks. Those who complete ABAD trainings have the chance to earn the title of ABADchi (ASAN Support to Family Business [ABAD], n.d.).

The Ministry of Agriculture is creating an electronic, media and print information and advisory services system to facilitate access to information and advisory services for agricultural producers. By accessing the electronic information and advisory portal to be created, agricultural producers will be able to receive detailed information on measures covering all stages of production and market information for each agricultural product. This will have a positive impact on the efficient planning of production in general. In addition, the possibilities of providing information and advisory services to producers through social media, as well as telephone communication, will be explored. To educate agricultural producers, videos and television programs will be prepared and posted on local television channels and video sharing systems on the Internet. ASIAC will prepare proposals on the creation of a farmer radio and (or) a farmer television for farmers and submit them to the relevant institutions. In addition, posters, brochures and other printed materials of an information and advisory nature will be prepared, published and distributed among agricultural producers (ASAN Support to Family Business [ABAD], n.d.).

We believe that after these measures, a functioning system of information and advisory services in agriculture will be formed in the country, which will facilitate access to advice and information for agricultural producers. The scope of entities

offering information and advisory services will be ensured to cover other regions and areas in addition to cities.

Azerbaijan's involvement in the VEHUB4YOU project and its success in integrating virtual business education into its educational institutions

In addition to the measures taken in the field of entrepreneurship in rural business in the Republic of Azerbaijan, participation in various international projects allows to eliminate the entrepreneurial skills gap. The existence of such projects plays an important role in the development of entrepreneurial skills among people engaged in agriculture. One of such projects is the Virtual Youth Business Hubs International Network (VEHUB4YOU) project.

The results of the survey conducted within the framework of the project also show that there is a great need for the integration of virtual business education into educational institutions.

Monitoring of local requirements, initial needs and expectations of participants (students and facilitators) in the creation of an international network of virtual youth business hubs was carried out on the basis of an online survey in Google-forms, the participants of which were 361 teachers and 2294 students from different countries. The survey was conducted on the basis of questionnaires developed by project participants during February-May 2023.

The results of the monitoring of local requirements, needs and expectations of facilitators in the creation of an international network of virtual youth business hubs allowed us to obtain the following information.

361 respondents took part in monitoring the needs and interests of facilitators in the creation of an international network of virtual youth business hubs: school teachers and teachers of higher education institutions and colleges from Ukraine and Azerbaijan. The geographical distribution of participants is: 211 respondents (58%) from Azerbaijan and, accordingly, 150 (42%) facilitators from Ukraine. According to the results of the survey, which was preceded by educational work among the facilitators regarding the goals and expected results of the project implementation, as well as the development of a certified program for improving the skills of facilitators,

80.3% of the respondents expressed a desire to take part in the Erasmus+ international project for free and become a certified facilitator/trainer of the virtual youth business hub, and 19.7% did not express such a desire. 86.1% of respondents from different countries express a desire to supplement the programs available in their educational institutions with new European practices of virtual learning in the field of business education, while 13.9% of respondents did not express such a desire. The needs of teachers-potential facilitators in international business education are diverse. According to the survey, the majority of respondents, 237 people (65.7%) have a desire to acquire new business knowledge and skills; 222 people (61.5%) - improve qualifications; 217 people (60.1%) - to improve the level of knowledge of a foreign language. 191 people (52.9%) of participants expressed interest in creating an international partnership; 129 (35.7%) - in participation in international mobility. In addition to professional knowledge and skills, survey participants intend to improve the level of communication skills and soft-skills, in particular, the level of foreign language proficiency (64.0%), intercultural communication (48.8%), intercultural communication skills (48.6%), communication with foreign colleagues based on virtual mobility (9.4%), communication through international business hubs (3.9%). Participants see participation in international virtual mobility programs in different ways. The majority of respondents (88.3%) prefer to participate in international trainings; 43.9% - participation in international round tables; 23.6% - participation in international debates; 20.8% - in the Olympics; 19.4% - case competitions (Monitoring local requirements, initial needs and expectations…, 2023).

Interesting are the results of the survey of facilitators regarding the courses that are most useful for students, which facilitators can offer for international virtual mobility programs and which they wish to learn through participation in the Facilitator Training Program.

According to the results of the study, the most popular courses for facilitators are: basic financial literacy - 58.2%, organization of own business - 45.7%; digitalization - 41.0%, business communications - 41.0%; business design and startup management - 36.8%; economy for business - 35.7%; digital platforms for business - 34.9%, digital

communication tools - 31.9%; creating a virtual store - 31.9%; social networks for business - 31.6%; project management - 32.7%, management - 30.5%. There is a significant need for facilitators in courses related to marketing: online marketing - 33.2%; offline marketing - 15.2%; principles of marketing -26.6%, 3D visualization for virtual marketing - 24.1%, social networks for business - 31.6%. In the educational process, teachers of universities and colleges, school teachers use various educational platforms that allow to increase the efficiency of the educational process, including in the online format (Monitoring local requirements, initial needs and expectations…, 2023).

According to the results of the survey, it can be concluded that the majority of the surveyed teachers (86.1%) are interested in participating in the international youth virtual mobility program as certified facilitators / trainers of the virtual youth business hub with the receipt of an international certificate of professional development under the ERASMUS-EDU-2021-VIRT project -EXCH in the amount of 180 hours, 6 credits (Monitoring local requirements, initial needs and expectations…, 2023).

Teachers are interested in both formats of international mobility: synchronous and asynchronous.

The courses of international virtual mobility programs are most in demand among teachers: basic financial literacy, organization of one's own business; digitalization, business communications; business design and startup management; economics for business, digital platforms for business, digital communication tools; creation of a virtual store; social networks for business; project management, management.

The results of the monitoring of local needs, requirements and expectations of students in the creation of an international network of virtual youth business hubs allow us to obtain the following information.

2,294 respondents took part in the survey of students' needs and interests in the creation of an international network of virtual youth business hubs: school students, university and college students. from Ukraine and Azerbaijan. The geographical distribution of respondents is: 1406 respondents (61.3%) from Azerbaijan and, accordingly, 888 (38.7%) respondents from Ukraine (Monitoring local requirements,

initial needs and expectations…, 2023).

The age structure of the respondents was as follows.

The majority of survey participants (49.7%) are aged 18-24; 18.8% - 13-15 years old, 24.6% - 16-17 years old; 6.9% - 25-30 years old. The vast majority of students (89.9%) want to become business owners in the future. During the survey, it was found that the majority of students (57.7%) intend to improve the level of foreign language proficiency through participation in international mobility programs. According to the survey, most students want to participate in international virtual mobility programs in a hybrid format: 39.7% - in a mixed format, 28.4% - online, 32% - offline. Thanks to participation in international virtual mobility programs, students want to develop and improve various communication skills: 70.3% of respondents want to improve their knowledge of a foreign language; 30.9% of respondents want to communicate with foreign peers; 21.6% - to communicate through international virtual hubs. Among the business competencies that survey participants would like to develop, 5.4% wish to develop business competencies; 55.2% - skills of creating own business; 23.2% - skills in creating startups. According to respondents, the formats of conducting virtual mobility events should be diverse. 50.1% want to participate in international summer schools, 43.5% - in international training; 40.9% - in practical classes; 25.5% - lectures; other participants also chose to participate in Olympiads, case competitions, international round tables (Monitoring local requirements, initial needs and expectations…, 2023).

The results of a survey of students regarding the courses they wanted to learn in international virtual mobility programs are interesting. According to the results of the research, the most popular courses for students are (Monitoring local requirements, initial needs and expectations…, 2023):

- organization of own business 42.9%; economy for business - 37.0%; basic financial literacy - 33.7%, online marketing - 32%; social networks for business - 27.9%; management - 27.7%; creation of an online business (marketplace) - 25.2%; project management - 23.2%; business communications - 21.7%; business design and startup management - 25.2%; offline marketing - 19.2%;

- courses aimed at developing students' digital skills: digital platforms for business - 22.5%, digital communication tools - 14.9%; digitization - 19.6%; 3D visualization for virtual marketing - 18.0%;

- courses related to social networks and the possibility of using their functions for business: social networks for business - 27.9%; Instagram for business - 28.5%; Tiktok for business - 23.1%; YouTube for business - 23.5%; Facebook for business - 15.5%; LinkedIn for business - 7.6%; Telegram for business - 17.8%; Chat bots for business - 16.6%; Animation for business - 10.9%.

The majority of surveyed students (79.1%) have a desire to participate in joint lessons with their peers from other countries online and wish to receive a Certificate (90%) about international studies within the framework of a European project.

According to the results of the survey, it can be concluded that the majority of surveyed students (89.9%) want to become owners of their own business in the future, and therefore are interested in participating in the international youth virtual mobility program. Students are interested in all formats of international mobility: synchronous and asynchronous (Monitoring local requirements, initial needs and expectations…, 2023).

By participating in the international youth virtual mobility program, students wish to develop and improve their communication skills: level of foreign language proficiency; communication with foreign peers; communication through international virtual hubs. Students also wish to develop business competencies; skills of creating your own business; skills in creating and implementing startups.

The most popular international virtual mobility courses for students are (Monitoring local requirements, initial needs and expectations…, 2023):

- organization of one's own business, economics for business, basic financial literacy, online marketing, social networks for business, management, creation of an online business (marketplace), project management, business communications, business design and startup management, offline marketing;

- courses aimed at developing students' digital skills: digital platforms for business, digital communication tools, digitization, 3D visualization for virtual

marketing.

The results of the conducted survey of facilitators and students regarding their wishes and expectations from the international virtual mobility program make it possible to draw the following conclusions:

- most of the respondents are interested in participating in the international virtual mobility program;
- survey participants are ready to participate in the international virtual mobility program in synchronous and asynchronous formats;
- facilitators and students need to develop communication skills and business competencies based on participation in the international youth virtual mobility program;
- the courses most in demand among facilitators are: basic financial literacy, organization of one's own business; digitalization, business communications;
- business design and startup management; economics for business, project management, management, digital platforms for business, digital communication tools; social networks for business;
- the most popular among students are the courses of the international youth virtual mobility program: organization of one's own business, economics for business, basic financial literacy, business communications; online marketing, offline marketing, social networks for business, management, project management, business design and startup management.

During this period, Azerbaijan, represented by Mingachevir State University (MSU), was distinguished by its active participation in the VEHUB4YOU project. Initially, an online target audience survey was developed in Google Forms for teachers and students to determine the business education expectations of different target audience groups. The topics addressed in the survey covered various areas such as the development of economic behavior skills based on virtual exchange: European university, familiarization with the European education system; business creation and management, taking into account European digitalization strategies, green transformation, inclusion, etc (Mingachevir State University, n.d.).

Within the framework of the project, MSU employees participated in various seminars organized in partner countries to share best practices in business education, startup activities, etc.

A Business Wednesday with the invited businessman in Azerbaijan which included the concept of Success story of an entrepreneur - was conducted in online format by practicing entrepreneurs from 4 project partner countries.

A total of 60 hours (2ECTS) of lessons on Management were organized by an employee of MSU. Within the framework of the project, lectures were held on the topics of Introduction to Management: Identifying Leadership Potential, Setting Goals for Success, Effective Communication: Building Relationships, Time Management: Managing Personal Work Schedule, Teamwork and Collaboration: Achieving Together, Leadership Skills: Becoming a Positive Influence, Problem Solving: Finding Creative Solutions, Decision Making: Making the Right Choices, Emotional Intelligence: Cultivating Self-Awareness and Empathy, Adaptation and Resilience: Developing in a Changing World. In the online lectures, questions of interest to students were answered, and topical issues of management were discussed. Student evaluation was conducted based on lecture participation as well as answers to individual assignments given after each lecture (assignments were presented using various teaching methods) (Mingachevir State University, n.d.).

MSU prepared video training lessons for VEHub's leaders and facilitators (university professors, people who work with youth, school and lyceum teachers, college teachers), who will be the leaders of the hubs. The lessons covered the following topics (Mingachevir State University, n.d.):

- Virtual technologies in financial literacy.
- The use of virtual exchanges to study the peculiarities of organizing your own business in the EU.
- Digital communications in education and training.
- National platforms for organizing virtual learning.
- Working with mentors to prepare an international virtual exchange for schoolchildren.

In addition, MSU selected its module for the programme (Implementation of international practices Azerbaijan) intended for training of facilitators and trainers of virtual digital business hubs. Agreements and the Charters with secondary schools and a college were signed. Facilitators trainings were organized at MSU. The schoolteachers have already enrolled in online trainings by RISEBA and Foggia University. Moreover, on site trainings, which is conducted by MSU academic sttaff were delivered at university auditoriums. Also, recorded courses on the website of the VEHUB4YOU for asynchronous learning for students from Ukraine and Azerbaijan were developed. Moreover, MSU facilitators staff as well as secondary school teachers delivered seminars and courses on the addressed topics (Mingachevir State University, n.d.).

Based on the results of the survey and Azerbaijan's active participation in such projects, we can conclude that, given that developing the potential of young people in line with the requirements of rapidly changing global, regional and national labor markets is a priority, the VEHUB4YOU project, the main goal of which is to transfer business knowledge from the European Union to Ukrainian and Azerbaijani youth through the use of virtual exchange technologies, will play a significant role in strengthening the entrepreneurial ecosystem in educational institutions, developing business thinking, and promoting university-industry cooperation and innovation.

4.4. Methods used in developing economic skills among students studying in non-economics fields

There are many possible answers to the question, Why should a person study?: moral development, self-improvement, the opportunity to acquire specific knowledge for successful employment, and so on. In the theory of knowledge, in epistemology, the purpose of learning is to acquire reliable knowledge. How can we obtain it? To answer this question, let us recall the structure of the cognitive process. It consists of sensory and rational cognitive elements. There are three forms of sensory cognition: sensation, perception, and imagination.

The highest level of cognition - rational cognition, or abstract thinking - exists in the form of concepts, judgments, and inferences. Laws, principles, and theories are the results of abstract thinking. The goal of educational activity is not only the mastery of specially selected knowledge and the experience developed by humanity but also the improvement of knowledge, skills, and competencies. In the science of didactics, the object of research is the educational process.

The main goal of university students' economic preparation is the formation and development of economic culture and readiness for activity through the use of scientific knowledge.

The development of economic culture in a university setting is a guided process, implemented through both classroom and extracurricular activities with students. Economic education plays a key role in training economically literate specialists who possess a certain level of economic competence and can operate effectively in a market economy.

The strategic goal of the Education Policy of the Republic of Azerbaijan is to form high-quality professional education capable of meeting the demands of innovative economic development, society, and the needs of each individual. In the modern world, the training of any specialist serves to ensure rapid adaptation to the dynamically changing conditions of international competition. Thus, a specialist must independently master their profession, perform effectively in their field, and be prepared for continuous professional growth, thereby facilitating socio-professional mobility. Even when a modern individual is not engaged in business, economic, production, or financial activities, they do not exist outside economic relations.

The methods of using competence-oriented pedagogical approaches in the formation of practical skills make it possible to apply the basics of economic knowledge in various spheres of life through general cultural competencies. One of the phenomena observed in recent market economies is that employers tend to value the soft skills of highly educated, specialized professionals more than their hard skills. This is because, in order to adapt to the current competitive labor market, there is a demand for versatile professionals with entrepreneurial abilities. However, employers are often

not willing to incur additional costs for retraining specialists. On the other hand, in the current practice of higher education institutions, the number of economic courses is partially limited to specific specialties.

Gryshkevich O.V. and Ushakova E.O. note that economic literacy is the ability to think systematically in the field of economics and management, as well as to make decisions from the perspective of the optimal use of all types of resources and expenditures of income (Huseynzade, R. L., Azizova, Z. M., Aliyev, A. H., & Verdiyeva, U. M., 2021).

The effectiveness of forming students' economic literacy at various educational levels is determined by a number of objective and subjective factors in the developed model.

The subject of Economic Theory is an important course in all leading universities worldwide, based on international experience. The reason is that fundamental economic theory is, in almost its purest form, a public good and greatly contributes to improving human welfare. Moreover, economic theory provides a specific methodology and special tools for analyzing socio-economic processes occurring in society. During the study of economic subjects, students from non-economic fields should develop competencies in accordance with the course syllabus. The traditional learning process - knowledge transmission or memorization - often results in students being unable to apply existing knowledge in practice. In teaching practice, it is necessary to expand the use of methods that encourage students' interest and motivation in solving economic problems and enable the broad application of student-centered technologies (Faizuplyaeva, N. S. 2016).

Nevertheless, there is a need for pedagogical methods that help form economic literacy among students in non-economic fields. Methodological support in the process of developing economic literacy - such as teaching materials, curricula, workbooks for independent study, students' assignments, methodological recommendations, special courses, etc. - is considered an effective tool for forming competencies and competitiveness (Yıldırım, D., & Adem, Ö.,2021).

As one of the components of the modern economic system, the role of the university is crucial in the training of future specialists. In this regard, one of the priority tasks currently facing education systems is the adequate formation of a systematic economic level. The knowledge and decision-making skills that form the basis of economic activity are essential factors to varying degrees in every field (Karakılçık, N., & Uçar, **S.**, 2021).

Economic literacy is one of the primary tools for creating mechanisms that adapt an individual to their social environment. It serves as a means for understanding economic changes, acquiring economic knowledge on the path of personal development, and forming human capital.

Recently, project-based, competence-oriented, problem-oriented, and computer-based teaching methods have been widely used in the study of economic subjects. In Western countries and the United States, methods such as brain storming, the case method, simulations, and role-playing games are also extensively applied.

In the first year of higher education, students are introduced to the basics of economics, terms, and concepts. Various teaching methods are used in lessons to facilitate understanding and comprehension of theoretical material. For example, in independent research-oriented lessons, topics such as Money, the money market, Unemployment, forms of unemployment can be selected using teaching literature and online resources, as well as story-based lessons, seminars, and others.

To complete the sessions, tests and assignments with various options are used. Problem-based tasks are applied in game-oriented sessions. For example, Family Budget, Market and Production Factors, Employment, Unemployment belong to this category.

Computer presentations, implemented in the form of animations, illustrations, and game diagrams, are used as visual tools within a multimedia system. Students work independently on terminology, create glossaries, and prepare individual or group tests and crosswords. As independent work, they prepare informative reports and essays on topics of the Economics course. They also stage fragments such as How to motivate

people to work?, The Invisible Hand of the Market, and Pages from the Economic History of Humanity.

Students who acquire these competencies are expected to conduct surveys among consumers and sellers, organize experiments in market economy settings (markets, stores), and evaluate the advantages and limitations of existing methods for demand assessment and forecasting.

Case study involves a thorough investigation of an event to uncover its causes and driving factors. The case method (from English case – event, situation) is a teaching approach that requires the collective or individual search for solutions to a practical problem. Its distinguishing feature is the description of a problem situation based on real-life facts. Cases may be drawn from scientific, journalistic, artistic, or educational materials. The requirements for a case are:

1. Formulation of relevant problems that are open to discussion and have clear solutions;
2. Relevance of the text to the lesson topic and objectives;
3. Availability of sufficient information to analyze the problem under study and search for possible solutions;
4. Author-oriented evaluation of the problem.

To promptly record the results of the discussion, it is appropriate to provide the group with instructions and a template.

Stages of Working with Cases:

1. Read the text.
2. Identify the problem discussed in the text.
3. Determine how the problem (or problems) manifests itself.
4. Discuss possible solutions to the problem (brainstorming).
5. Prepare to present the group’s decision.
6. Present the final outcome of the work.

When using the case method, each student proposes solutions based on their existing theoretical knowledge, practical experience, and intuition. The primary function of this method is to teach students to independently solve relatively complex

problems that cannot be addressed through purely analytical means. The case method activates students, develops their analytical and communicative skills, and places them in practical, real-life situations (Karakılçık, N., & Uçar, **S.**, 2021).

In practical sessions, seminar participants can be divided into small groups. For Topic 1, Methods and Subject of Economic Theory, Task 1: Provide definitions for the following concepts.

1. Concept of Economics
2. Economic Needs
3. Economic Laws
4. Economic Methods
5. Subject of Economics

When delivering lectures, it is recommended to include certain practical blocks in the lecture material or, at the end of each lecture, offer students the following types of reflective tasks.

The Brainstorming Method covers the following main stages: preparation, idea generation, and analysis and evaluation of ideas. To solve any problem, two participant groups (usually 7–10 people each) are formed: the idea authors propose ideas, while the experts analyze them. The work of the groups is organized by a leader, whose responsibilities include formulating the task, dividing participants into groups, and ensuring that ideas are recorded. A key condition is the timely separation of the processes of proposing hypotheses and evaluating them. This allows students to freely discuss the problem and express as many ideas as possible in a comfortable and independent environment. An example topic for discussion might be: identify a new product or service in the 21st century that would have high demand among consumers regardless of gender or age.

The Delphi Method, or Delphi technique, is one of the expert evaluation methods for information gathering. The Delphi method helps select the best option from a proposed series of alternatives. It is applied in any situation requiring forecasting of demand, competition, the company, the product’s market position, and so on. For example, if five reasons for a decrease in demand for a certain type of service are

identified, which one should be considered primary and addressed first? A special table is prepared to facilitate the calculation.

Participants in the discussion first rank all the reasons according to their importance. Each person assigns the most important alternative first and the least important (fifth) last. Then, each alternative is evaluated on a 10-point scale according to the costs associated with each reason for the decrease in demand, with 1 being the lowest and 10 the highest. In the third stage, the two results for each alternative are multiplied, and the sums are calculated. The smallest sum indicates the reason that should be addressed first. The Delphi method is particularly effective during discussions (Yıldırım, T., 2019).

The purpose of this method is to develop discussion skills. The Aquarium Method can be conducted in several variations.

To teach students the rules of discussion, the aquarium method is used. Students are divided into two groups. One group sits on chairs inside the circle and discusses the problem proposed by the teacher, while the other group, seated outside the circle, observes whether the discussion is conducted according to the established rules.

The first group discusses the selected topic. After 15–20 minutes, the discussion is paused, and the participants of the outer circle evaluate the discussion process. The groups then switch places and continue discussing the problem.

Second variation of the Aquarium Method:

Participants in the inner circle discuss the problem proposed by the teacher, but unlike the first variation, they present only arguments in favor of the problem. The other group, seated in the outer circle, listens, takes notes, analyzes, and prepares counterarguments. After 15–20 minutes, the discussion is paused, and participants from the inner and outer circles switch places. They then conduct a discussion to refute the arguments of the previous participants. Reaching a consensus within the groups is not necessary.

The conditions for the formation of economic skills among students studying in non-economics fields will include the following:

a) The use of a set of student-centered technologies (assignments, modules, computer-based learning, training, etc.) aimed at the formation of sustainable economic knowledge and skills, the strengthening of students' economic identity, and the understanding of theoretical and practical economic knowledge and competencies, taking into account their future professional activities;

b) Involving students in practical economic activities that will help them successfully adapt to their professional careers;

c) Stimulating students' reflective positions, which allow them to adequately assess the level of their economic competence as well as their own educational and professional activities.

In such lessons, the theoretical aspects and features of using educational games, cases, and video cases are considered. It is demonstrated that games and cases help identify and shape values and culture in the process of intercultural communication, as well as develop students' creative and cognitive abilities. The characteristics of using pedagogical technologies in the teaching of subjects related to economics and management at the university are explained.

According to experts, the methodological basis for developing university students' economic literacy is a synthesis of normative, business-oriented, and contextual approaches that contribute to the professional training of the future specialist as a free and integrated individual.

The normative approach allows consideration of the objective regularities by which a person assimilates the norms and values of society (i.e., the cause-and-effect determinants and functional-role mechanisms necessary for forming a personality standard within a clearly defined system of values). The development of the content of professional education has highlighted the need for a sequential implementation of the project design algorithm: studying the production and technical conditions (equipment, technology, organizational environment) necessary for the purposeful activity of graduates of higher professional education institutions > identifying the connection between the elements of the established production and technical conditions and the relevant fields of scientific knowledge > determining the structure of the necessary

scientific knowledge > determining the relevant substructure of scientific knowledge > identifying the nomenclature of concepts required for the formation of professional knowledge, skills, and competencies > forming the subject structure of curricula > expert evaluation and adjustment of plans and programs.

The normative approach defines the goals and objectives of economic education primarily through external priorities related to forming a personality standard within a clearly defined and unambiguous system of values. These are methods, techniques, and strategies that allow the individual to be integrated into a socially acceptable system of roles and interactions in which they can contribute maximally to themselves and society in the most effective, optimal, and minimally disruptive way.

The normative-explanatory methodology justifies the content of education by taking into account the macro-characteristics of externally imposed processes expressed in the requirements of adaptive educational strategies. The normative approach implies the mandatory establishment of standards for the formation and development of competencies: the more substantiated and quantitatively expressed standards there are, the higher the organization of the educational process.

The business-oriented approach was initially used as a strategy for studying and establishing business processes. This approach allows addressing the problem of training economically active and enterprising future specialists. At the same time, the narrow focus of economic business education does not block other opportunities that might be more promising for a student's individual qualities in the labor market.

As the name suggests, the business-oriented approach emphasizes preparing students for their future business careers. It applies both to programs that prepare students for entrepreneurial careers and to future managers, accountants, employees of large companies, and others.

The process of developing university students' economic literacy is defined as the pedagogically justified, sequential, and continuous change of teaching acts in which students acquire an interconnected set of economic knowledge, skills, and attitudes. Thus, the stages of economic literacy development among university students are

determined as: orientation, informational, situational and practical, final, and corrective.

The inclusion of an indicative stage in the development of university students' economic literacy is necessary due to the discrepancies between applicants' ideas about their future professional activity and the requirements set by the State Standard of Higher Professional Education and modern society.

The correct selection of teaching methods and forms of organizing students' educational and cognitive activities, appropriate to the development level of students' individual psychological characteristics, plays an important role in organizing instruction.

These methods are used in education, social psychology, sociology, politics, and economics. For example, a person who wants to become an entrepreneur can study and analyze the stages they go through in their work to obtain valuable information about deficiencies in the field and the steps necessary to address them. In many countries, this method is considered both a pedagogical and effective research approach. Through this method, students broaden their economic worldview while studying economic subjects and develop the ability to work with various methods. With the help of these methods, students' creative abilities, their capacity to analyze unexpected situations, and their decision-making skills are enhanced (Faizuplyaeva, N. S., 2016).

Currently, all educational institutions are compelled to develop and implement information technologies in their educational activities. The use of information technologies allows students to organize and monitor independent work and provides opportunities for learners to study many subjects autonomously. It is sometimes concluded that massive online courses pose a challenge to traditional education. However, blended learning, which combines both approaches, has proven to be more effective than either method alone.

The application of innovative teaching methods in economics requires an active role from teachers. They act as facilitators, knowledge conductors, and mentors who motivate students' active learning activities. Teachers must possess deep knowledge of both economic theory and the application of innovative teaching methods. They create

structured scenarios, organize competitions, stimulate discussion and analysis, and support students in their learning.

Future prospects in the field of innovative teaching methods in economics promise deeper integration of technology and innovations into the educational process. The development of virtual and augmented reality, the use of artificial intelligence to tailor teaching materials to students' individual needs, and the creation of interactive educational platforms contribute to more flexible, effective, and engaging learning. Furthermore, future research on the impact of various innovative methods on students' performance, practical skills, and ability to apply knowledge in practice will be a key direction. This will allow for more accurate evaluation of the effectiveness of each method and their adaptation to specific educational contexts.

Innovative methods in economics teaching have the potential to transform educational approaches, making them more interactive, customized, and practice-oriented. The use of games, problem-based learning, virtual technologies, and interactive online platforms opens new opportunities for students, develops their skills, and fosters critical thinking. Teachers play a crucial role in guiding and supporting the learning process. With advancements in technology and research on the effectiveness of methods, education will continue to evolve in accordance with the demands of the modern economic environment and prepare a new generation of skilled and innovative economists.

CHAPTER 5
DIGITAL LITERACY AND SOCIO-CULTURAL IMPACTS OF VIRTUAL EXCHANGES AND HUBS

5.1 Cross-Cultural Learning

In the current context of globalization and internationalization of education, the issue of intercultural learning is becoming particularly relevant. Active migration processes, the development of academic mobility, and the growing role of intercultural communication in professional activities necessitate the formation of students' ability to interact effectively in a multicultural environment (Bennett, 2013; Deardorff, 2020).

Intercultural learning is seen as a process of developing the cognitive, emotional, and behavioral components of intercultural competence, which ensure harmonious interaction between representatives of different cultures (Spitzberg & Changnon, 2009). According to G. Hofstede, culture determines the system of values, norms, and behavior patterns that influence the process of learning and perception of information (Hofstede, 2011). In this context, education becomes not only a means of transferring knowledge but also a tool for forming intercultural dialogue and tolerance.

In modern pedagogical science, there is a growing interest in researching the pedagogical conditions, technologies, and methods of forming students' intercultural competence (Byram, 2021; Gudykunst, 2018). Some scholars emphasize that intercultural learning should be integrated into all levels of education as a component of the formation of global civic identity (UNESCO, 2022).

At the same time, the implementation of intercultural learning principles faces a number of challenges: language barriers, stereotypes, unequal access to cultural resources, and insufficient preparation of teachers to work in a multicultural environment (Chen & Starosta, 2019). This determines the need for scientific analysis of the theoretical foundations of intercultural learning and the search for effective pedagogical strategies for its implementation in modern educational institutions.

The purpose of this work is to analyze the theoretical and methodological foundations of intercultural education and to determine the pedagogical conditions for its implementation in the modern education system.

Intercultural education occupies a key place in modern pedagogical science, as it contributes to the formation of an individual's ability to interact effectively in conditions of cultural diversity. In scientific literature, this phenomenon is interpreted as the process of acquiring knowledge, values, norms, and behavior patterns that ensure constructive communication between representatives of different cultural communities (Byram, 2021; Bennett, 2013). Its content is determined by a combination of cognitive, emotional-value, and behavioral components, which together form intercultural competence.

The concept of intercultural competence is one of the central concepts in intercultural pedagogy. According to D. Deardorff, intercultural competence is the ability to interact effectively and appropriately with people who have different cultural orientations, values, and communication styles (Deardorff, 2020). M. Bennett (2013) emphasizes that the development of this competence is based on an evolutionary transition from ethnocentrism to ethnorelativism, i.e., from perceiving one's own culture as the norm to realizing the equivalence of cultural systems.

From a cultural studies perspective, intercultural learning is seen as a means of forming cultural awareness, which allows individuals to understand their own identity through interaction with other cultures (Gudykunst, 2018). G. Hofstede (2011) emphasizes that cultural differences in the perception of power, individualism, collectivism, or avoidance of uncertainty directly affect the educational process. Thus, taking cultural parameters into account becomes a necessary prerequisite for effective intercultural learning.

From a pedagogical point of view, intercultural learning is an integrative category that combines educational, communicative, and social aspects. It involves not only familiarizing students with the cultural realities of other peoples, but also developing critical thinking, empathy, tolerance, and openness to diversity (Chen & Starosta, 2019). Particular attention is paid to the development of reflective abilities that allow

students to become aware of their own cultural attitudes and adjust them in the process of intercultural dialogue.

The theoretical foundations of intercultural education are closely linked to the concept of global education, which aims to develop global citizens capable of constructive dialogue and cooperation (UNESCO, 2022). This approach is reflected in a number of international programs and grant initiatives that promote the development of intercultural competencies. In particular:

1. **Erasmus+ (European Union)** - an educational program that supports academic mobility, exchanges, and joint educational projects between educational institutions in different countries, aimed at developing intercultural communication and internationalizing education.

2. **Jean Monnet Actions** - an EU initiative that funds research and training courses on European values, cultural diversity, and civic education.

3. **DAAD (German Academic Exchange Service)** - a program that supports intercultural educational projects, language training, and research in the field of intercultural pedagogy.

4. **Fulbright Program (USA)** - a grant program for teachers and students that promotes intercultural exchange of knowledge, ideas, and experience in the humanities and social sciences.

5. **UNESCO Intercultural Dialogue Programme** - ініціатива, спрямована на зміцнення міжкультурної взаємодії та підвищення якості освіти через інтеграцію культурного компоненту.

Thus, intercultural learning emerges not only as a pedagogical strategy, but as a global educational paradigm that promotes tolerance, solidarity, and responsible citizenship in the 21st century.

The modern educational space is characterized by a high level of openness, mobility, and digitalization, which creates favorable conditions for the development of intercultural learning. Universities are increasingly becoming not only centers of knowledge but also platforms for cultural dialogue, integration, and social interaction. Changes in global education policy, in particular the implementation of the Erasmus+,

Horizon Europe, and UNESCO Global Citizenship Education Initiative programs, necessitate a rethinking of traditional pedagogical approaches and contribute to the formation of a new type of educated personality - an interculturally competent citizen of the world (UNESCO, 2022; European Commission, 2021).

The internationalization of higher education is a key mechanism for spreading intercultural practices. Within the Erasmus+ and Jean Monnet Actions programs, joint training courses, summer schools, and seminars are created that bring together students and teachers from different countries. Such forms of learning promote the development of intercultural communication skills, improve foreign language proficiency, and build skills for working in multicultural teams (Byram, 2021).

In the Ukrainian educational space, this process is implemented through the participation of universities in European and global academic networks. In particular, Kyiv National University of Technologies and Design (KNUTD), Ivan Franko National University of Lviv, and National University of Kyiv-Mohyla Academy participate in joint research and educational initiatives with foreign partners, which allows for the implementation of intercultural educational modules and dual degree practices.

The development of the digital educational environment has created new opportunities for intercultural interaction. Platforms such as Coursera, edX, FutureLearn, and Virtual Exchange projects within Erasmus+ facilitate the exchange of experiences between students from different countries in a virtual format. Such practices establish a new paradigm of learning, where geographical boundaries do not limit intercultural communication (Helm, 2020).

Virtual academic exchanges are becoming increasingly popular in Ukrainian universities. These are integrated courses in which groups of students from different countries work together on learning tasks under the guidance of teachers from both institutions. This promotes not only the development of intercultural competence, but also digital literacy and teamwork skills.

An important factor in the effectiveness of intercultural learning is the existence of institutional strategies and support from universities. European universities have

special centers - International Offices and Intercultural Learning Hubs - that are responsible for helping foreign students adapt, conducting cultural training, organizing language clubs, and holding integration events.

In Ukraine, similar initiatives are being developed within the framework of projects by the British Council Ukraine, House of Europe, and Erasmus+ National Office in Ukraine, which support intercultural training, academic exchanges, and training for teachers in intercultural education methods. This allows for the creation of a supportive learning environment based on the principles of openness, respect for diversity, and social inclusion.

Thus, intercultural education in the modern educational space is becoming systematic, becoming an integral part of university development strategies. Its implementation ensures the improvement of the quality of education, the formation of global competence, and the strengthening of the international authority of higher education institutions.

The development of intercultural competence is a key task of modern education, which aims to train specialists capable of operating effectively in a globalized, multicultural environment. In scientific works (Deardorff, 2020; Byram, 2021; Chen & Starosta, 2019), intercultural competence is considered an integrative formation that combines cognitive, affective, and behavioral components. This competence encompasses the ability to empathize, be tolerant, reflect on one's own cultural attitudes, and be communicatively flexible in intercultural situations.

In pedagogical practice, intercultural competence is developed through a combination of cognitive-informational, communicative-activity, and value-reflective approaches (Spitzberg & Changnon, 2020).

1. The cognitive-informational approach involves familiarizing students with the basic concepts of cultural studies, sociolinguistics, ethics of intercultural interaction, history, and traditions of different peoples. This can be implemented through courses in cultural anthropology, intercultural communication, and global studies.

2. The communicative-activity approach focuses on developing effective intercultural interaction skills through interactive forms of learning - role-playing,

discussions, simulations of intercultural situations, and project-based learning. Such methods contribute to the formation of teamwork, empathy, and adaptability skills.

3. The value-reflective approach emphasizes the development of self-awareness, awareness of one's own cultural references, and the formation of ethical attitudes of respect for the other. In this context, it is important to use methods such as reflective essays, portfolios of intercultural communication experiences, and self-assessment of communication strategies.

Digital technologies that enable global interaction and access to cultural content contribute to the development of intercultural competence. The use of platforms such as Padlet, Mentimeter, Zoom, Miro, and Google Classroom allows for the organization of joint international educational projects in the format of virtual exchange or collaborative online international learning (COIL).

Within the Erasmus+ Virtual Exchange programs, students from Ukrainian and European universities jointly develop cultural studies cases and explore topics of identity, language policy, and interethnic communication. Such experience promotes not only the exchange of knowledge, but also the formation of trust, mutual respect, and responsibility in a multicultural environment (Helm, 2020).

European universities are actively implementing intercultural learning practices through Service Learning - a combination of learning and community service aimed at solving social problems in multicultural communities (Bringle & Clayton, 2021). This approach is gaining popularity in Ukrainian universities, particularly within the framework of the House of Europe, British Council Active Citizens, and Erasmus+ Capacity Building in Higher Education projects.

In the process of intercultural education, teachers act not only as a source of knowledge, but also as facilitators of dialogue, mentors, and mediators between cultures. They must possess intercultural sensitivity, the ability to create an inclusive educational environment, and encourage students to critically reflect on cultural differences.

To help teachers grow professionally in this area, there are international educational programs like Erasmus+ Staff Mobility, Fulbright Scholar Program, and

DAAD Training for University Teachers, which support sharing experiences and bringing intercultural educational practices into the learning process.

Thus, the formation of intercultural competence is a complex process that involves the integration of content, activity, and value components of education. Its result is the training of a new generation of specialists who are open to dialogue and able to act effectively in conditions of cultural diversity and global challenges.

Intercultural learning is a strategic direction in the development of modern education that meets the needs of a globalized society and prepares individuals for effective interaction in a multicultural environment. Theoretical analysis has shown that intercultural learning is based on the integration of cognitive, affective, and behavioral components that shape the intercultural competence of learners.

The development of intercultural learning is closely linked to the processes of internationalization of education, digitization of the learning environment, and the spread of global educational initiatives such as Erasmus+, Jean Monnet Actions, UNESCO Global Citizenship Education, Fulbright Program, etc. These programs create real opportunities for intercultural dialogue, academic mobility, and the integration of students from different cultures into joint educational projects.

The practical results of implementing intercultural learning show that it not only promotes the acquisition of knowledge about other cultures, but also develops key 21st-century skills in students, such as critical thinking, creativity, communicative flexibility, tolerance, and the ability to collaborate. The role of the teacher in this process is crucial: they act as a facilitator of intercultural dialogue and a mentor who instills the values of openness and mutual respect in students.

Thus, intercultural education is an important component of the humanitarian dimension of education, ensuring the formation of culturally aware, socially responsible, and globally oriented specialists. Its further development requires support at the level of state educational policy, the development of international partnerships, and the improvement of teaching staff qualifications in the field of intercultural education.

5.2. Gender and inclusivity in virtual hubs

In today's context of educational transformation, when digitalization and globalization create new opportunities for learning and professional development, issues of inclusion and gender equality are gaining particular importance (Table 5.1).

Table 5.1. Indices of Gender Parity among Students of Educational Institutions of Ukraine

Levels of education according to ISCED	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23*	2023/24*
Bachelor's degree or equivalent	1,166	1,130	1,121	1,093	1,083	1,074	1,081	1,064	1,081	1,092	1,143	1,131	1,047	0,910
Master's degree or equivalent	1,396	1,385	1,366	1,290	1,296	1,278	1,243	1,298	1,277	1,289	1,431	1,403	0,944	0,755

* – Excluding listeners and students of educational institutions in the territories temporarily occupied by the russian federation and part of the territories where combat actions are/were carried out.

Source: Dzherstat of Ukraine, 2017

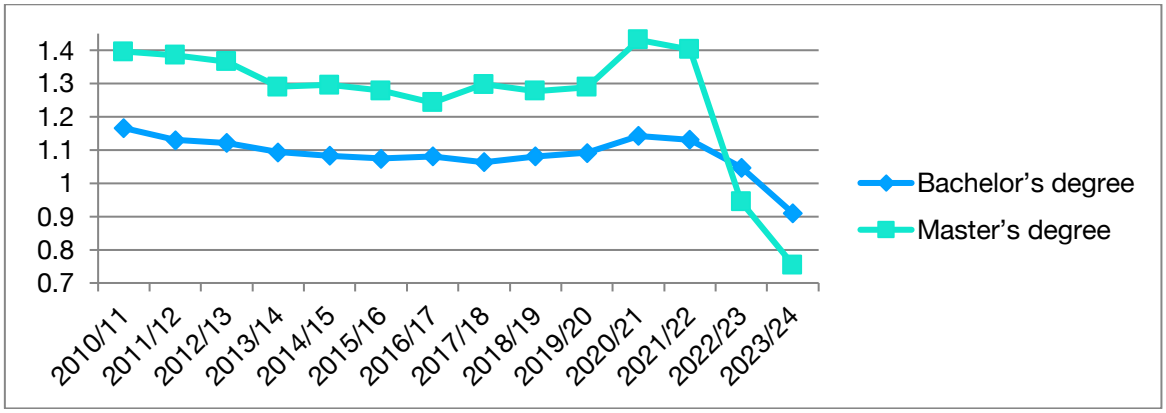

Fig.5.1. Gender parity indices among students of higher education institutions in Ukraine for 2010-2024.

Source: constructed by the author based on data from (Dzherstat of Ukraine, 2017) and Table 5.1

The gender parity indices (correlation of the number of females to the number of males) presented in Table 1, calculated using the UNESCO methodology, indicate that from 2010 to 2021, women consistently predominated among bachelor's and master's degree students in Ukraine. However, starting in 2022, the index fell below 1.0, which indicates a trend of decreasing the number of women in higher education. This is due to the impact of war and migration processes (some women could go abroad or temporarily stop their studies); changes in the structure of specialties (increasing demand for IT, technical, military areas, where the majority of students are men); a shift in gender priorities in professional choice due to crisis conditions, etc. Such dynamics requires attention from educational policy, especially in the context of inclusivity and gender parity in the digital environment.

The introduction of digital technologies into education not only opens up new opportunities for academic exchange, but also poses new challenges in ensuring equal access to these opportunities for representatives of different social, cultural, and gender groups (Dombróvska, S. M., & Shevchuk, Yu. R. 2022; Tsalko, T. R., & Nevmerzhytska, S. M., 2021 and 2023).

The modern higher education system is actively developing models of virtual academic exchanges, in particular, such international initiatives as COIL (Collaborative Online International Learning), eTwinning and Erasmus+ Virtual Exchange. These formats are aimed at expanding intercultural interaction, forming global competencies and developing tolerance among students from different countries. Thanks to digital tools, such programs make international cooperation accessible even to those who do not have the opportunity to physically travel (European Commission, 2021; CUNY, LaGuardia Community College; Gabriel, M., 2021).

However, despite the increasing availability of virtual education, not all participants have equal opportunities to be included in such programs. There are gender, socio-economic, cultural and technological barriers that can limit the participation of certain groups of students. Women (in particular, due to religious beliefs, etc.), students with special needs, representatives of socially vulnerable groups

or those living in regions with low levels of digital infrastructure often face unequal conditions of participation.

At the same time, international documents, in particular the UN Sustainable Development Goals (SDG 4 – Quality Education and SDG 5 – Gender Equality), emphasize the importance of ensuring inclusive, equitable and quality education and gender equality. The European Digital Education Strategy (Digital Education Action Plan 2021-2027) also guides educational institutions to create equal opportunities in the digital learning environment, develop digital competences and social integration (United Nations Development Programme, European Commission, 2021).

In the field of virtual education, accessibility involves adapting digital platforms, ensuring accessibility of content for people with disabilities, developing digital competencies, and expanding participation in international exchange programs.

Virtual exchanges, as an innovative form of academic mobility, have significant potential for implementing the principles of inclusiveness, as they eliminate geographical and financial barriers, facilitate the participation of students with different educational needs, and expand the space for intercultural dialogue. At the same time, these issues become particularly relevant in the context of the post-war restoration of Ukrainian education, when digital formats of cooperation with international partners become one of the key ways to support the integration of Ukrainian students and lecturers into the European educational space (Lenkaitis, C. A., & Loranc, B., 2021; Tsalko T., Nevmerzhytska S., 2021; Tsalko T., Olshanska O., Nevmerzhytska S., 2023).

In Ukraine, these processes have received strong support through state and public initiatives aimed at creating a society of equal opportunities. In particular, the Without Barriers initiative, launched by First Lady of Ukraine Olena Zelenska in cooperation with the Cabinet of Ministers of Ukraine, is aimed to eliminate physical, digital, language, educational and psychological barriers that limit citizens' participation in public life. In the context of education, this means creating conditions in which every student – regardless of gender, age, health status, social or cultural background – has equal access to education, including in online and hybrid formats.

A number of projects are also being implemented in Ukraine, including:

- National Strategy for Closing the Gender Pay Gap by 2030,
- Gender equality strategy in education,
- National Council on Barriers and Equal Opportunities,
- educational campaigns Of course you can! aimed at supporting girls and women in science, technology, IT and management (Olena Zelenska, 2023, May 12; Olena Zelenska Foundation, 2025, May 23).

These initiatives not only shape public understanding of gender parity, but also set standards for educational institutions: equal access, anti-discrimination, creating a safe and supportive learning environment. They contribute to the formation of a gender-sensitive culture in higher education, which is a key element of modern inclusive pedagogy.

Systematic work in the field of gender equality and accessibility has not only a political but also a profound socio-cultural impact. It contributes to increasing the level of tolerance and empathy in educational communities; developing the leadership potential of women and youth in digital education; and popularizing the idea that inclusion is not an exception, but the norm of the modern educational space.

In this context, virtual education becomes an effective tool for implementing national strategies - after all, the digital environment, with the right approach, can be even more inclusive and open than traditional offline education (Nevmerzhytska, S. M., 2025).

The principles enshrined in these state initiatives can be effectively implemented through international virtual academic mobility programs (COIL, eTwinning, Erasmus+ Virtual Exchange). These formats create a digital environment in which gender equality, cultural diversity, and mutual respect become the core values of joint activities of students and lecturers.

Participation in such programs contributes to:

- expanding educational opportunities for women and representatives of socially vulnerable groups;

- development of intercultural communication skills, tolerance and cooperation;

- formation of global citizenship and digital ethics competencies.

Exploring the possibilities of the COIL, eTwinning and Erasmus+ Virtual Exchange programs allows to assess how these tools can be used to deepen inclusion, ensure gender balance and develop intercultural understanding.

Thus, the relevance of issues of inclusivity and gender equality is due to:

- the growing role of digital education and virtual formats of academic mobility;

- the need to ensure equal access to educational opportunities regardless of gender, social status or physical abilities;

- the need to form an inclusive culture of intercultural dialogue in the global educational space;

- insufficient research into the effectiveness of virtual programs in implementing the principles of gender equality and inclusion.

Therefore, the study of inclusive education in a virtual environment through the prism of gender parity and intercultural interaction is not only theoretically significant, but also has high practical value for developing educational policies, improving international cooperation programs, and forming socially responsible, open, and fair digital education.

The development of digital technologies and the transition to distance learning have fundamentally changed the educational space. However, along with new opportunities, the digitalization of education poses a number of challenges to ensuring inclusivity, equal access, and social justice (Nevmerzhytska, S. M., & Tsalko, T. R., 2024; Chernyshova, D., 2023; Pichik, K. V., Humenna, O. V., & Chovnyuk, L. Yu., 2020):

1. Digital inequality and differences in levels of access to information and communication technologies

One of the key challenges is the digital divide – the difference in access to information and communication technologies, high-speed internet and digital literacy. For many students from low-income families, rural areas or regions where digital infrastructure is underdeveloped, distance education becomes not an opportunity, but an obstacle. The digital divide is also manifested in the level of technology use – some students have modern digital skills, while others need additional support.

2. Technical and methodological inadaptability of educational content for people with special needs

A second major challenge is ensuring the accessibility of content for individuals with special educational needs. While digital technologies have great potential to support such students (through adaptive interfaces, text broadcasts, screen readers, etc.), in practice, not all platforms meet universal design standards. Educational resources are often not adapted to the needs of users with visual, hearing, or motor impairments, which creates barriers to participation and exacerbates social isolation.

3. Gender and social barriers in access to online programs

A third challenge is the gender imbalance in digital education. Research shows that women, especially in low- and middle-income countries, have fewer opportunities to access technology, which limits their participation in virtual educational programs. In addition, women are more likely to face a double burden of combining education, work and family care, which reduces the effectiveness of their inclusion in distance learning.

4. Psychological isolation and insufficient level of social integration of distance learning participants

Another pressing issue is the psychological isolation of students in digital format, which can affect the level of engagement, motivation and academic performance. In the context of online interaction, it is more difficult to form a sense of belonging to an educational community, which is critically important for students from marginalized groups.

5. Cultural one-sidedness in the content of digital educational courses

It is also worth considering intercultural and linguistic barriers. Digital educational platforms focused on international collaboration are often based on English-language content, which limits the participation of students with insufficient language proficiency. The lack of a culturally sensitive approach in content can contribute to the reproduction of stereotypes or cultural asymmetry in the learning process.

Overcoming these challenges requires a systemic approach, the development of digital infrastructure, the implementation of universal design for learning (UDL), the training of educators to work in an inclusive online environment, and the formation of a culture of equality and tolerance in virtual communities.

International Virtual Exchange programs, such as COIL (Collaborative Online International Learning), eTwinning, and Erasmus+ Virtual Exchange, are one of the most dynamic trends in modern education. They bring together students, lecturers, and educational institutions from different countries in a shared digital environment for collaboration, knowledge exchange, and intercultural competence development.

The main advantage of these programs is the reduction of barriers to access to international education. While traditional forms of academic mobility require significant financial and time resources, virtual exchanges allow participation in international educational projects regardless of place of residence, social status or physical capabilities. This creates conditions for inclusivity, expanding the circle of participants in international cooperation.

The COIL program, initiated by New York University, is focused on collaborative learning among students from different countries through collective projects, case discussions, and interactive sessions. This format promotes the development of communication skills, critical thinking, intercultural understanding, and equal partnership among participants.

The European initiative eTwinning brings together schools and universities across Europe to create collaborative online projects that promote the values of inclusion, democracy, gender equality and cultural diversity. The platform offers a safe

space for lecturers and students to collaborate, reducing the risks of discrimination or inequality.

Erasmus+ Virtual Exchange, in turn, provides virtual dialogues between young people from Europe, North Africa and the Middle East. The program aims to develop tolerance, social integration, civic engagement and leadership among young people. One of its tasks is to overcome social and gender barriers to access to international education.

Virtual exchanges create a socially safe environment for students, particularly those from vulnerable groups, to express themselves. They help overcome stigma, build experiences of equal partnership, and support the development of an inclusive culture in higher education.

In addition, such programs play a significant role in shaping digital and social competence, which is a prerequisite for active participation in the global knowledge society. They not only teach academic skills, but also develop empathy, mutual respect, and responsibility - qualities that are critical for building inclusive educational communities (Nevmerzhytska, S. M., 2025).

Therefore, international virtual exchanges act as a catalyst for equal educational opportunities because they:

- expand student participation regardless of socioeconomic status or physical limitations;
- promote gender equality and overcoming stereotypes through joint activities in multicultural groups;
- form a culture of intercultural dialogue and inclusion;
- support the professional and personal development of students in the digital environment.

Thus, virtual international exchanges are not only a tool for the digitalization of education, but also an important mechanism for implementing the principles of inclusion and social justice in the global educational space.

Inclusive education is one of the key directions of development of modern educational systems aimed at ensuring equal access to quality education for all learners, regardless of their physical, social, cultural, gender or economic characteristics. It is based on the recognition of the value of human diversity, tolerance and the need to adapt the educational environment to the needs of each student.

According to the definition of UNESCO (UNESCO, 2020), inclusive education is a process of systemic change aimed at eliminating barriers to learning that arise from discrimination, stigmatization or inequality. Its goal is not only to include students with special needs in the educational process, but also to create conditions in which every learner can realize his or her own potential (UNESCO, 2020).

In the context of higher education, inclusion takes on special significance, as universities shape the intellectual potential of society and set standards for equality and social responsibility. Modern higher education institutions must move from an access for all model to an active participation of everyone model, where students not only receive equal opportunities for learning, but are also involved in co-creating an inclusive academic space.

Inclusive higher education involves:

- creating an accessible physical and digital environment (architectural, informational, communication accessibility);
- implementing universal design for learning (UDL)– flexible lecturing methods that take into account different learning styles;
- providing academic support for students with special educational needs (mentoring, adapted courses, technical aids);
- lecturers' training to work in an inclusive environment by improving their pedagogical and digital competence;
- development of an institutional culture of tolerance, gender equality and non-discrimination.

Inclusive education in higher education goes beyond purely social policy – it is an element of strategic university management, as it contributes to expanding the

educational space, attracting new audiences, and increasing the competitiveness of the institution at the global level.

In the context of international cooperation, inclusive education is seen as a tool for cultural diplomacy and sustainable development. It contributes to the formation of an environment in which representatives of different countries, cultures, languages and religions can learn together, enriching each other with experience and knowledge. This approach is in line with Goal 4 of the UN 2030 Agenda for Sustainable Development (SDG 4) – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UNESCO, 2020).

Integrating inclusive principles into international educational programs (COIL, eTwinning, Erasmus+ Virtual Exchange, etc.) ensures:

- expanding access to international education for students who are unable to participate in physical exchanges due to financial, family, or physical limitations;
- formation of intercultural competence, empathy and respect for diversity;
- overcoming gender, social and cultural barriers through joint activities in virtual teams;
- improving the quality of educational programs thanks to the cooperation of universities from different countries and the use of digital technologies.

A feature of inclusion in the virtual environment is the combination of social and technological dimensions. On the one hand, this is the social value of equality of opportunities; on the other hand, there is the practical need to adapt digital platforms, courses and communication tools for different groups of users. That is why the modern concept of inclusion in higher education includes digital inclusion - access to the Internet, possession of digital skills, as well as the ability to interact effectively in a virtual environment.

The participation of universities in international virtual mobility programs allows for the practical implementation of the principles of inclusion through online partnership projects, joint courses, and intercultural discussions. Such programs form a new paradigm of inclusive education, where physical, social, or cultural boundaries

lose their significance, and the main thing is the accessibility of knowledge and mutual respect in educational interaction.

Thus, inclusive education in the context of higher education and international cooperation is not only the process of integrating different social groups into the educational space, but also a global strategy for forming an open, fair, and interculturally sensitive society in which knowledge becomes the common property of humanity.

In the 21st century, education is increasingly viewed not only as a tool for transferring knowledge, but as a social mechanism for ensuring equality, justice and sustainable development. One of the key areas of this approach is gender equality, which is a component of the general concept of inclusive education. In the context of the digital transformation of the educational space, gender issues are taking on new dimensions, as digitalization opens up both new opportunities for women and men, and new forms of inequality.

The concept of gender mainstreaming in education emerged in the late 20th century within sociocultural theories that viewed education as a space for socialization and identity formation. According to the definition of UNESCO (UNESCO, 2019), gender equality in education means equal access, participation, success and influence of women and men at all levels of the education system (UNESCO, 2020).

Gender is not only a biological, but primarily a socio-cultural construct that determines the roles, expectations, and opportunities of individuals in society. In this context, education serves as a medium for reproducing or overcoming gender stereotypes.

Gender-sensitive education is focused on creating a learning space where:

- no gender dominates the educational materials;
- lecturing methods are not based on stereotypes about the abilities or roles of men and women;
- both sexes have equal opportunities for participation, leadership, and self-fulfillment.

This approach is closely related to the concept of gender mainstreaming - the integration of the gender dimension into all educational policies and practices, including digital innovations, personnel policies, pedagogical technologies, and assessment systems.

The development of digital education has significantly influenced the mechanisms of access to knowledge, but at the same time has exacerbated the problem of digital inequality between genders.

According to the UNESCO Institute for Statistics (2023), women make up about 48% of Internet users worldwide, but their share is significantly lower in low-income countries (Chernyshova, D., 2023; European Commission, 2021). There is also a gender gap in access to technology education: girls are less likely to choose IT, STEM and programming-related majors. This affects not only their digital literacy, but also their future career opportunities.

The problem of the digital gender divide covers three levels:

1. access to technology (devices, internet, educational platforms);

2. digital skills (ability to use tools effectively, create digital content);

3. use of opportunities (participation in programs, leadership projects, entrepreneurship, online education, etc.).

In higher education, this is manifested in the fact that women often have less access to resources or face social barriers - double burden (study and family), lack of time, prejudices about the role of women in the digital environment.

The idea of gender-inclusive digital education is not only about providing technical access, but also about creating a safe, supportive, and fair online environment where everyone has equal opportunities for self-realization.

Digital learning can be a powerful tool for women's empowerment, particularly in countries or communities where socio-cultural constraints on women's participation in public life exist. Online courses, virtual exchange programs, and distance learning formats can overcome physical, economic, and cultural barriers, opening up access to global knowledge.

However, it is important that digital tools and educational platforms take gender sensitivity into account in their structure, design and content to:

- avoid the use of stereotypical images and roles;
- provide flexible participation schedules to support a balance between study, work, and family;
- guarantee psychological safety in virtual interaction (protection from cyberbullying, discrimination, etc.).

A gender-sensitive approach to digital education also includes supporting female leadership, mentoring, creating networks for mutual support between female students and lecturers, and also developing digital entrepreneurship among women.

International virtual exchange programs (Erasmus+ Virtual Exchange, COIL, eTwinning) are important platforms for promoting gender equality in education. They create conditions for joint learning of students from different cultures, including women and representatives of socially vulnerable groups, who were previously excluded from academic mobility.

Such programs contribute to:

- balanced participation of men and women in international teams;
- formation of leadership competencies in female students through participation in project-based learning;
- development of gender awareness in lecturers who implement interuniversity online courses;
- creating a global community of support, which promotes the principles of gender inclusiveness.

Thus, international digital interaction serves not only as a tool for educational integration, but also as a resource for transforming social norms and enhancing the role of women in the global educational process.

Digitalization creates new opportunities to overcome discrimination and expand women's participation in global education, but only if gender-sensitive strategies are consciously implemented. International virtual exchanges, by combining digital

technologies with humanistic values, have the potential to become a platform for realizing true gender equality in higher education.

In today's globalized world, intercultural dialogue is becoming a key condition for successful international cooperation in education. Virtual exchanges act as effective platforms for creating an educational space without borders, where students from different countries can interact, exchange experiences, develop critical thinking and cultural sensitivity.

Digital communication technologies (videoconferencing, interactive platforms, joint projects in virtual environments, etc.) create a new form of social interaction – a digital intercultural space. In this space, a specific culture of communication is formed, based on the principles of tolerance, empathy, respect for diversity and equality of participants, regardless of their social, gender or ethno-cultural background.

However, despite its advantages, digital interaction is not without challenges: from language barriers to differences in communication styles, which can complicate mutual understanding. Therefore, it is important to develop intercultural communicative competence in students, that is, the ability to communicate effectively in conditions of cultural diversity, while maintaining one's own identity and respect for others.

The virtual environment is becoming a new form of socio-cultural space, where values, norms and symbols of different cultures are combined. It contributes not only to the transfer of knowledge, but also to the development of social skills necessary for participation in a global society: flexibility, openness, tolerance, and the ability to work in a team (Gnatenko, Ya., 2019; Kuznetsova, O. O., & Kolomyitseva, A. O., 2021).

Intercultural dialogue in digital format has a double effect:

- educational (consists in broadening horizons, involving students in the international context, and forming global citizenship);
- social (consists in developing trust, mutual understanding, eliminating prejudices and gender stereotypes, and strengthening social cohesion).

In this context, inclusion is not only an educational but also a socio-cultural principle that ensures respect for diversity and the active participation of all population groups in a shared learning process.

Programs like Erasmus+ Virtual Exchange allow students from different countries to work on joint educational or research projects, communicate online, and share experiences and ideas. This format creates conditions for practical intercultural learning – not only through academic content, but also through interpersonal interaction.

The key outcomes of such exchanges are:

- increasing cultural awareness and reducing ethnocentrism;
- forming the value of diversity as an educational resource;
- developing digital communication skills needed in the global job market.

Thus, intercultural dialogue in the digital educational space becomes a means not only of learning, but also of social integration (Gnatenko, Ya., 2019; Kuznetsova, O. O., & Kolomyitseva, A. O., 2021). Therefore, it is important to:

1. Integrate intercultural and inclusive education in curricula, especially in disciplines related to communication, management, pedagogy, and social sciences.

2. Develop digital platforms for international cooperation, which ensure the participation of students from diverse social and cultural backgrounds, including those from groups with disabilities.

3. Increase the digital literacy of lecturers and students, particularly in the field of intercultural communication, to reduce technical and psychological barriers in virtual interaction.

4. Maintain gender balance and diversity in international project teams, contributing to the development of inclusive leadership and an ethical culture of communication.

5. Promote scientific research and monitoring the effectiveness of virtual exchange programs in terms of their impact on social integration, equality and cultural understanding, etc.

In the modern educational space, virtual exchanges are becoming an important tool for developing intercultural competence, social empathy, and tolerance among young people. Globalization processes, digitalization of education, and expansion of international cooperation programs provide students with the opportunity to engage in intercultural dialogue without physical borders, which significantly transforms the approach to learning, upbringing, and the formation of civic values (Aškerc Zadravec, K., 2023).

Intercultural competence is defined as the ability to interact effectively and ethically with people from other cultures, taking into account their social norms, values, traditions, and worldviews. It encompasses not only knowledge of other cultures, but also the development of communication skills, emotional intelligence, critical thinking, and empathy.

In a virtual educational environment, the formation of this competence has its own specifics:

- communication occurs mainly indirectly (through digital platforms), which requires students to be precise in their statements, and to be able to understand subtext and non-verbal signals in a virtual format;
- cultural distance is reduced through joint projects and group tasks that promote natural understanding of cultural differences;
- interactivity and collaborative learning become a means of overcoming prejudices and stereotypes.

Thus, intercultural competence in a digital context is not only an academic goal, but a social resource that shapes the readiness of future professionals to operate in a multicultural global environment.

Programs such as Erasmus+ Virtual Exchange, COIL, eTwinning create conditions for students from different countries to work together on educational or research projects. These interactions not only expand professional competences, but also contribute to the socio-cultural enrichment of participants, which is manifested in an increase in the level of tolerance, respect for differences and readiness for constructive dialogue.

Key aspects of the impact of such programs:

1. increasing cultural awareness – students gain real experience of intercultural cooperation, become familiar with different models of behavior, learning, and communication;

2. reducing cultural barriers – thanks to joint tasks and digital interaction tools (forums, video discussions, collaborative platforms), students learn to find common ground, even with different values or habits;

3. development of empathy and reflection – in the process of virtual communication forms the ability to empathize, analyze one's own attitudes and behavior in an intercultural context;

4. developing global citizenship skills – virtual exchanges contribute to the awareness of shared responsibility for social challenges - such as ecology, human rights, gender equality, social inclusion.

Tolerance in this context appears not only as a moral category, but as a competence for action – the ability to maintain productive cooperation with people who differ in cultural, linguistic, or ideological characteristics.

Digital interaction also acts as a space for the development of social and communication skills. Online education creates unique opportunities for social learning – when students not only gain knowledge, but also learn to communicate, resolve conflicts, and coordinate activities in virtual teams (Nevmerzhytska, S. M., 2025).

The experience of such exchanges shows that:

- working together on projects helps build trust and partnership, regardless of cultural background;
- the use of digital collaboration tools (Google Workspace, Miro, Padlet, Zoom, etc.) stimulates the development of digital competencies and the ability to adapt to technological changes;
- mutual discussion of problems and reflection on experiences strengthen emotional literacy and interpersonal communication skills.

What is especially valuable is that virtual formats create an inclusive environment: participation in such projects does not depend on social status, physical abilities, or geographical location of students. This significantly expands the circle of participants in the international educational process.

As a result, participants in virtual exchange programs demonstrate:

- increasing openness to others;
- increasing tolerance for uncertainty and cultural differences;
- improving team interaction and communication skills;
- expanding social connections through international student networks, etc.

This confirms that digital interaction is not only a means of learning, but also a mechanism for forming a socially responsible personality, capable of acting in conditions of cultural diversity.

Therefore, virtual exchanges are an effective tool for developing intercultural competence, as they combine educational, communicative and social aspects of interaction. Participation in such programs contributes to the formation of tolerance, empathy and openness, which are fundamental for the sustainable development of education and society. The development of intercultural competence through virtual exchanges supports the principles of inclusiveness and gender equality, creating conditions for the participation of representatives of different social groups in the global educational process. Educational institutions should integrate such forms of cooperation into curricula, providing methodological support, digital literacy and pedagogical support for students.

Virtual exchanges are not just a technical form of learning, but a new pedagogical paradigm that combines digital innovation with humanistic values of inclusion, equality, and respect for cultural diversity. Successful implementation of such programs in universities will contribute to the formation of a generation of students, capable of effective collaboration, creativity, and global responsibility.

5.3. Developing digital competencies in the European Union

The digital transformation of the European economy and society has positioned digital competence as a foundational requirement for active citizenship, employability, and entrepreneurial innovation. Over the past decade, the European Union has articulated an ambitious vision for digital empowerment, exemplified by the Digital Education Action Plan 2021–2027 and the 2030 Digital Compass, which set explicit targets for digital skills acquisition, digital infrastructure, and the integration of advanced technologies across all sectors (European Commission, 2021; Vuorikari et al., 2022). The EU aims for at least 80% of adults to possess basic digital skills by 2030, alongside a significant increase in ICT specialists and digitally skilled entrepreneurs, as essential drivers of competitiveness and social cohesion (Bachmann et al., 2024).

Digital competence is now recognized not only as a technical skillset but as an integrated combination of knowledge, skills, attitudes, and values required to navigate, create, and critically engage in digital environments (Baroni et al., 2019; Cedefop, 2022). The COVID-19 pandemic has further accelerated the urgency of digital upskilling, exposing persistent gaps in access, equity, and pedagogical readiness across and within Member States (Bocconi et al., 2022). In response, the European Commission has promoted a multi-level ecosystem for digital skills development, combining policy frameworks such as DigComp with bottom-up initiatives, public-private partnerships, and the proliferation of micro-credentialing and non-formal learning pathways (Pinto et al., 2021).

Recent research emphasizes that digital competence is a complex, multidimensional construct that extends beyond technical proficiency to include cognitive, socio-emotional, and ethical dimensions (Baroni et al., 2019; Vuorikari et al., 2022). The DigComp framework, developed by the European Commission, provides a comprehensive model for defining and assessing digital skills, and has become a reference point for educational policy and practice both within and beyond the EU (Vuorikari et al., 2022). However, the effective development and certification

of digital competences remain uneven, with studies highlighting the need for tailored interventions, greater investment in teacher training, and the integration of digital skills into lifelong learning strategies (Bocconi et al., 2022; Bachmann et al., 2024).

The intersection between digital competence and entrepreneurship is gaining increasing attention in both policy and academic discourse. Digital skills are now seen as essential for fostering entrepreneurial intention and engagement, particularly among young people and students (Sansone et al., 2024; Pinto et al., 2021). The integration of digital and entrepreneurial competencies is recognized as a key strategy for preparing individuals to create value, adapt to technological change, and participate actively in the digital economy (Bachmann et al., 2024; Bacigalupo et al., 2016).

This chapter critically examines the evolution and implementation of digital competence frameworks in the EU, with particular attention to their integration in entrepreneurship education and their role in addressing the digital divide. Drawing on recent empirical research, policy analysis, and comparative studies, the discussion situates the EU's experience within the broader international debate on digital transformation, lifelong learning, and inclusive digital education.

Conceptual Foundations of Digital Competencies

The Evolving Definition of Digital Competence

The concept of digital competence within the European Union has undergone a significant transformation, moving from a narrow focus on basic computer literacy to a multidimensional and dynamic understanding. As highlighted by the European Commission, digital competence is now defined as the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is a combination of knowledge, skills and attitudes. This definition is now embedded in EU policy, legislation, and educational practice, reflecting the recognition that digital competence is not static but must evolve alongside technological change, societal needs, and individual aspirations. According to Cedefop, digital competence is a key enabler for employability, social inclusion, active citizenship, and entrepreneurial success, and must be developed across the lifespan and in diverse learning environments.

The Structure and Evolution of the DigComp Framework

The Digital Competence Framework for Citizens, known as DigComp, developed by the European Commission's Joint Research Centre, is the primary reference for conceptualizing, assessing, and developing digital skills in the EU. Since its initial release in 2013, DigComp has been updated several times, with the most recent version, DigComp 2.2, reflecting the rapid evolution of digital technologies, the growing importance of datafication and artificial intelligence, and the need for a more holistic approach to digital literacy. As described by Vuorikari and colleagues, DigComp 2.2 articulates digital competence through five core domains, each further divided into specific competences and proficiency levels, providing a comprehensive and adaptable structure for both policy and practice.

The five domains of DigComp 2.2 are:

- Information and Data Literacy;
- Communication and Collaboration;
- Digital Content Creation;
- Safety;
- Problem Solving.

Each domain is operationalized with detailed descriptors and real-world examples, allowing adaptation to different educational, professional, and social contexts. Recent updates to DigComp place greater emphasis on data literacy, algorithmic thinking, and the societal and ethical implications of digitalization, reflecting a shift from a purely instrumental to a more critical and reflective approach. Baroni and colleagues note that DigComp 2.2 introduces new themes related to data and artificial intelligence, with a strong focus on understanding data and the societal implications of digital technologies.

Digital Competence as a Socio-Economic Enabler

Both academic literature and EU policy documents converge in recognizing that digital competence is a foundational enabler for economic growth, innovation,

employability, and social inclusion. The European Pillar of Social Rights Action Plan and the Digital Decade Policy Programme set ambitious targets for digital skills, aiming for at least 80% of adults to possess basic digital skills by 2030. However, persistent gaps remain. As highlighted by Cedefop, significant disparities in digital skills acquisition are linked to age, education, gender, socioeconomic status, and geographic location, and targeted interventions are needed to bridge these divides.

The COVID-19 pandemic has further accelerated the urgency of digital upskilling, exposing persistent gaps in access, equity, and pedagogical readiness across and within Member States. Bocconi and colleagues emphasize that the pandemic revealed the need for robust digital pedagogical competences among educators and the importance of inclusive strategies for digital skills development.

Theoretical Underpinnings: Lifelong Learning, Inclusion, and Adaptability

The EU's approach to digital competence is grounded in the principles of lifelong learning, inclusion, and adaptability. The Council Recommendation on Key Competences for Lifelong Learning explicitly positions digital competence as one of eight key competences necessary for personal fulfillment, active citizenship, social inclusion, and employability in a knowledge society. Academic research underscores the need for continuous upskilling and reskilling to keep pace with technological change and labor market demands. Bachmann and colleagues observe that digital skills, especially coding and digital literacy, have a significant positive impact on entrepreneurial intention and engagement among students and young professionals.

Moreover, the integration of digital skills with transversal competences - such as critical thinking, creativity, and problem-solving - is increasingly seen as essential for preparing individuals to navigate complex digital environments and contribute to innovation and social cohesion. The DigComp framework itself is designed to be adaptable, supporting the development of tailored curricula and assessment tools that reflect local needs, sectoral priorities, and emerging technologies.

Digital Competence and Entrepreneurship: The DEC and EntreComp Synergy

The intersection between digital competence and entrepreneurship is a growing focus in both policy and academic literature. The Digital Entrepreneurial Competencies framework, as synthesized by Pinto, Galán, and Palacios, builds on DigComp by integrating entrepreneurial skills such as digital value proposition design, platform-based business modeling, and algorithmic decision-making. This is particularly relevant as digital technologies transform business models, market entry strategies, and the nature of innovation.

The EntreComp framework, developed by Bacigalupo and colleagues, complements DigComp by defining entrepreneurship as a transversal competence encompassing creativity, ethical and sustainable thinking, resource mobilization, and action orientation. Pinto and colleagues argue that the integration of DigComp and EntreComp is essential for preparing individuals not only to use digital tools but also to create value, adapt to technological change, and participate actively in the digital economy.

A mapping of DigComp domains to key entrepreneurial functions demonstrates how core digital competences underpin essential digital business activities:

- information and Data Literacy: Market analysis, opportunity recognition, data-driven decision making;
- communication and Collaboration: Networking, digital marketing, stakeholder engagement;
- digital Content Creation: Product development, branding, digital prototyping;
- safety: Risk management, data protection, compliance;
- problem Solving: Innovation, business model adaptation, resilience.

International and Comparative Perspectives

Comparative research demonstrates that DigComp is not only a European reference but is increasingly adopted or adapted in non-EU contexts, serving as a foundation for national digital skills strategies and educational reforms. Nguyen and colleagues show that effective implementation of digital competence frameworks

requires integration with local curricula, alignment with labor market needs, and sensitivity to issues of equity, inclusion, and cultural diversity. International organizations such as UNESCO have developed complementary frameworks, including the Digital Literacy Global Framework, which emphasize the need for tailored approaches for different learner groups, including youth, adults, and marginalized populations.

This comparative lens highlights both the strengths and the limitations of a one-size-fits-all approach to digital competence development. Baroni and colleagues suggest that the challenge is to ensure that digital competence frameworks are not only adopted in policy but also implemented in practice, with attention to inclusion and quality.

Critical Reflections and Future Directions

While DigComp and its related frameworks provide a robust conceptual foundation, their effective operationalization depends on ongoing research, contextual adaptation, and a commitment to equity and lifelong learning. The integration of digital, entrepreneurial, and transversal skills is increasingly recognized as essential for navigating the complexities of the digital society and economy, but the challenge remains to ensure that these frameworks translate into meaningful learning experiences and measurable outcomes for all learners.

Persistent challenges include bridging the digital divide across regions, generations, and social groups; ensuring the inclusion of women and underrepresented groups in digital education and careers; developing assessment and certification systems that are recognized and portable across the EU; supporting educators and trainers in acquiring and updating their own digital competences; and adapting frameworks to address emerging technologies such as artificial intelligence, cybersecurity, and data science.

Policy Frameworks and Implementation in EU Member States

The Strategic Role of EU Policy in Digital Competence Development

The European Union has placed digital competence at the heart of its strategic vision for economic growth, social inclusion, and global competitiveness. As stated in

the Digital Education Action Plan 2021–2027, the development of high-quality, inclusive and accessible digital education is a shared priority across all Member States, requiring coordinated action and investment at both EU and national levels (European Commission, 2020). The Action Plan sets out two main strategic priorities: enabling a high-performing digital education ecosystem and enhancing digital skills and competences for the digital transformation. This policy framework is not only a response to the rapid digitalization of society but also a call to action for stronger collaboration among stakeholders, including governments, educational institutions, industry, and civil society (European Commission, 2020; Digital Skills and Jobs Platform, 2024).

A high-performing digital education ecosystem, as described by the European Commission, requires not only robust technical infrastructure and connectivity but also effective digital capacity building, digital skills among teachers and educators, and the availability of high-quality digital learning content and secure, ethical online platforms (European Commission, 2020). The COVID-19 pandemic further accelerated the urgency of these priorities, revealing structural weaknesses and persistent inequalities in access to digital resources and pedagogical readiness across Member States (Bocconi et al., 2022).

The DigComp Framework as a Policy Reference

The Digital Competence Framework for Citizens (DigComp) has become the reference model for defining, assessing, and developing digital skills across EU Member States and beyond (European Commission, 2022). DigComp's structure - five core domains subdivided into specific competences and proficiency levels - enables its adaptation to a wide range of policy contexts, from national education strategies to workforce development programs (Vuorikari et al., 2022).

The implementation of DigComp is supported by complementary frameworks, such as DigCompEdu for educators and DigCompOrg for educational organizations, as well as self-reflection tools like SELFIE and SELFIEforTEACHERS. These instruments enable schools, teachers, and policymakers to assess digital readiness, identify gaps, and design targeted interventions for capacity building (European

Parliament Think Tank, 2025). The European Commission has also promoted the creation of the European Digital Skills Certificate (EDSC), aiming to provide a standardized, EU-wide recognition of digital competences for citizens, workers, and students (European Commission, 2023).

National Strategies and Diverse Approaches

While the EU provides the overarching policy framework, the implementation of digital competence development is shaped by national strategies, priorities, and contexts. According to the Digital Skills and Jobs Platform, in many EU member states, digital skills development targets are integrated in general national education, industry digitalization, or employment strategies and policies (Digital Skills and Jobs Platform, 2024). For example, Ireland's Digital Strategy for Schools to 2027 aims to ensure that all learners acquire the digital skills needed to navigate an ever-evolving digital world, while France's Digital Strategy for Education 2023–2027 focuses on strengthening students' digital skills and accelerating the use of digital tools for educational success.

In Hungary, the Digital Workforce Program targets both the education system and the labor market, promoting digital upskilling for students, teachers, and employees. Lithuania's Digitalisation Roadmap 2019–2030 and Sweden's National Digitalisation Strategy for the School System 2023–2027 similarly emphasize the integration of digital competences into curricula, teacher training, and organizational development.

As highlighted by Cedefop, the diversity of national approaches reflects differences in digital maturity, educational systems, and socio-economic priorities, but also creates opportunities for mutual learning and the sharing of best practices (Cedefop, 2022).

Financial Instruments and Capacity Building

The EU supports digital skills development through substantial financial instruments, including the Recovery and Resilience Facility (RRF), the European Social Fund Plus, the Digital Europe Programme, and Erasmus+. According to the European Parliament Think Tank, an estimated €28.3 billion from the Recovery and Resilience Facility has been allocated to digital skills and education, with additional support from the European Social Fund Plus and the Digital Europe Programme for

advanced digital technologies and the scaling up of digital skills training and certification (European Parliament Think Tank, 2025).

Erasmus+, in particular, has prioritized digital transformation as a horizontal theme for the 2021–2027 period, supporting projects aimed at improving the use of ICT in teaching and learning, developing digital pedagogical competences, and fostering international collaboration through virtual exchanges (European Commission, 2021).

Implementation Challenges: Gaps, Disparities, and Best Practices

Despite significant progress, the implementation of digital competence frameworks faces persistent challenges. As noted by Szanter and Matuska, the digital competence of EU citizens remains unsatisfactory, with large discrepancies between countries and population groups (Szanter & Matuska, 2024). Disparities are particularly pronounced between urban and rural areas, among older adults, and for individuals with lower educational attainment or socio-economic status.

Project-based learning initiatives and open online tools for certifying digital skills have emerged as effective strategies for bridging these gaps. Szanter and Matuska's research demonstrates that project-based learning initiatives generating open and free online tools for certifying existing and acquired digital skills in the EU are recommended to raise and certify the level of digital competence for different target groups. The development of a unified system of EU standards for digital competence certification is seen as a crucial step toward greater competitiveness and sustainability in the European labor market.

Best practices identified in various Member States include targeted upskilling programs for teachers, the integration of digital competence assessment into national qualification frameworks, and the use of DigComp to design and evaluate digital skills curricula for both formal and non-formal education (European Commission, 2022). The use of labor market intermediaries, such as employment agencies and training providers, has also proven effective in supporting the digital upskilling of jobseekers, employees, and entrepreneurs.

Case Examples: Implementation Across Member States

A comparative analysis of national frameworks reveals a variety of approaches to digital competence development. In Germany, the DigitalPakt Schule program has invested heavily in digital infrastructure, teacher training, and the development of digital curricula. In Spain, the National Plan for Digital Skills (Plan Nacional de Competencias Digitales) emphasizes the inclusion of vulnerable groups and the alignment of digital skills training with labor market needs.

In Italy, the Piano Nazionale Scuola Digitale (PNSD) has promoted the integration of digital competences across all levels of education, with a focus on teacher professional development and the creation of digital innovation hubs. Latvia has prioritized digital skills as part of its National Development Plan, supporting both formal and informal learning pathways for students, teachers, and the workforce.

These examples illustrate the adaptability of the DigComp framework and the importance of tailoring implementation strategies to local contexts, resources, and priorities.

The Role of Stakeholders: Collaboration and Governance

Successful implementation of digital competence policies depends on the active collaboration of multiple stakeholders. The Digital Education Action Plan calls for stronger collaboration between governments, educational institutions, industry, and civil society to ensure that digital education is inclusive, high-quality, and accessible for all (European Commission, 2020). National digital education hubs and cross-sectoral partnerships are increasingly recognized as essential for scaling up digital skills initiatives, sharing resources, and fostering innovation.

The European Commission has established working groups, such as the Digital Education Working Group, to support Member States in implementing policy reforms and exchanging best practices. Self-reflection and peer-learning tools, such as SELFIE and DigiEduHack, further promote grassroots innovation and capacity building at the institutional and community levels (European Parliament Think Tank, 2025).

Future Directions: Toward a Unified and Inclusive Digital Skills Ecosystem

Looking ahead, the EU's policy agenda emphasizes the need for a unified, inclusive, and adaptive digital skills ecosystem. As outlined in the Council

recommendations on successful digital education, EU education systems must foster future-proof skills and lead forward the twin digital and green transition, rather than merely adapt to changing circumstances (European Council, 2023). This vision requires ongoing investment in digital infrastructure, teacher training, curriculum innovation, and the recognition of digital skills through standardized certification systems.

International collaboration, research, and the sharing of best practices will remain essential for addressing persistent gaps and ensuring that all citizens can participate fully in the digital society and economy. As highlighted by the UNESCO Digital Competence Framework, tailored approaches for different learner groups, including youth, adults, and marginalized populations, are needed to ensure equitable access to digital skills development (UNESCO, 2024).

Challenges and Persistent Gaps in Digital Competence Development

The Digital Skills Gap: Between Policy Ambitions and Empirical Realities

Despite the strategic emphasis placed by the European Union on digital upskilling, empirical evidence consistently demonstrates that the digital skills gap remains a structural challenge across Europe. As noted by Zhao, most university students and teachers have a basic level of digital competence. However, there is substantial heterogeneity in the depth and breadth of these skills, reflecting differences in institutional priorities, access to resources, and pedagogical approaches (Zhao, 2021). Similarly, Cedefop highlights that significant disparities in digital skills acquisition are linked to age, education, gender, socioeconomic status, and geographic location, and targeted interventions are needed to bridge these divides (Cedefop, 2022).

Eurostat data confirm that only a minority of Member States are on track to meet the EU's Digital Decade target of 80% of adults with at least basic digital skills by 2030, with countries such as Romania and Bulgaria lagging far behind more digitally mature states like Finland and the Netherlands (Eurostat, 2023; Binder, 2025). These findings are echoed in a systematic review by Oberländer and colleagues, who argue that the content and depth of digital competence are unevenly distributed, not only

across countries but also within educational sectors and population groups (Oberländer et al., 2020).

Socio-Demographic and Educational Disparities

A growing body of research has documented the persistence of digital divides along socio-demographic lines. As summarized by Hammoda and Foli, digital competence is closely associated with prior educational attainment, socioeconomic background, and access to digital infrastructure. Learners from disadvantaged backgrounds are less likely to develop advanced digital skills, compounding existing inequalities (Hammoda & Foli, 2024). This is confirmed by the findings of Zhao, who notes that institutions of higher education are encouraged to focus on the development of students' and teachers' digital competence, yet resource disparities continue to shape outcomes (Zhao, 2021).

The COVID-19 pandemic exacerbated these divides, as highlighted in a systematic review by Bocconi and colleagues: The transition to emergency remote teaching exposed the fragility of digital competence among both educators and learners, particularly in contexts with limited access to technology and insufficient training (Bocconi et al., 2022). This aligns with the conclusions of Audrin, who found that critical inquiry, responsibility, and well-being are among the least developed dimensions of digital skills in the workforce, with vulnerable populations most at risk of exclusion (Audrin, 2024).

Gender Gap and Underrepresentation in Digital Professions

The gender gap in digital competence and careers persists as a critical issue in the European context. As noted by Binder, the share of women among ICT specialists in the EU remains low, and girls and women are underrepresented in digital studies and careers, despite targeted policy interventions (Binder, 2025). This observation is supported by the work of Bacigalupo and colleagues, who argue that greater diversity in digital professions is associated with higher levels of innovation and competitiveness, yet systemic barriers continue to limit women's participation (Bacigalupo et al., 2016). The literature suggests that interventions must go beyond

awareness campaigns and address structural factors such as gender stereotypes, access to mentorship, and curriculum design (Veerasamy & Nair, 2020).

Lifelong Learning, Upskilling, and the Challenge of Motivation

The imperative for continuous upskilling and reskilling is widely recognized in the literature. As stated by Hammoda and Foli, digital competence is not a static attribute but requires ongoing investment in learning, reflection, and adaptation to technological change (Hammoda & Foli, 2024). However, barriers to lifelong learning persist, including limited access to training, lack of motivation, and inadequate recognition of informal and non-formal learning (Bocconi et al., 2022). According to Zhao, the development of digital competence frameworks must be accompanied by strategies to motivate learners, validate diverse learning pathways, and ensure that upskilling opportunities are accessible to all (Zhao, 2021).

The Shortage of Advanced Digital Skills and Emerging Competencies

While basic digital skills are essential, the shortage of advanced digital experts, particularly in fields such as artificial intelligence, data science, and cybersecurity, poses a major risk to Europe's innovation capacity. As highlighted by Binder, there is a growing demand for advanced digital skills in areas such as artificial intelligence, programming, data management and cybersecurity, yet supply is not keeping pace with demand (Binder, 2025). Audrin's research further demonstrates that the framework for digital skills at work must extend beyond basic proficiency to encompass critical inquiry, responsibility, and the ability to adapt to new digital contexts (Audrin, 2024). This is echoed in the Draghi Report, which underscores the importance of education and training systems in equipping people with high-quality skills in an inclusive manner (Binder, 2025).

Assessment, Certification, and the Validity of Digital Competence Measurement

A critical challenge in the field is the development of valid, reliable, and portable instruments for assessing digital competence. As noted by Hammoda and Foli, the proliferation of digital competence frameworks has not always been matched by rigorous assessment tools, and there is a need for standardized, evidence-based

approaches to certification (Hammoda & Foli, 2024). A literature review by Education and Information Technologies (2022) found that few procedures to guarantee the validity and reliability of digital competence questionnaires were identified, and the instruments are mainly self-assessment statements and closed-ended questions (Education and Information Technologies, 2022). This finding is consistent with the work of Oberländer and colleagues, who emphasize the need for robust methodologies to capture the multidimensionality of digital competence and to inform policy and practice (Oberländer et al., 2020).

Pedagogical and Institutional Barriers

The literature consistently highlights the importance of pedagogical innovation and institutional support for digital competence development. As noted by Zhao, the development of social structure and trends in using technology have already changed not only how we live but also how we acquire knowledge, making it imperative for educational institutions to prioritize digital competence as a core objective (Zhao, 2021). However, as outlined by Hammoda and Foli, the successful implementation of digital competence frameworks depends on the adequacy of digital infrastructure, structured training, and the alignment of technology integration with curricular and industry needs (Hammoda & Foli, 2024). Practice-based training models, such as digital portfolios and structured academic portfolios, have shown promise in vocational education, yet gaps remain in equitable access and reflective task design (Hammoda & Foli, 2024; Education and Information Technologies, 2022).

The Need for Data-Driven Monitoring, Evaluation, and Policy Adaptation

Finally, the literature calls for more robust, data-driven approaches to monitoring progress, evaluating impact, and informing policy adjustments. As stated by Hammoda and Foli, regular collection and analysis of digital skills indicators, as well as qualitative feedback from learners and educators, are crucial for ensuring that initiatives remain relevant and effective (Hammoda & Foli, 2024). The diversity of digital competence frameworks and the variability in methods and content can create confusion and hinder policy coherence, underscoring the need for meta-frameworks and harmonized evaluation strategies (Oberländer et al., 2020; Zhao, 2021).

Challenges and Persistent Gaps in Digital Competence Development

The Structural Digital Skills Gap in the European Union

Despite the ambitious targets set by the European Union - such as reaching 80% of adults with at least basic digital skills by 2030 - the empirical reality demonstrates a persistent and multifaceted digital skills gap. As highlighted by the Joint Research Centre, only 55.6% of the EU's adult population currently meet the basic digital competence threshold, and projections indicate that without urgent and targeted measures, just 60% may achieve these skills by 2030 - a significant shortfall from the Digital Decade target (Joint Research Centre, 2025). This gap is especially evident in digital content creation, cybersecurity, and online learning, which remain critical for employability and active citizenship (European Commission, 2025; Bocconi et al., 2022).

Recent studies confirm that digital competence is now an obligation for employers and employees alike, and that the rapid digitalisation of society has made digital skills a prerequisite for participation in both the labour market and daily life (Juhász et al., 2022). However, the European skills landscape is marked by clear fragmentation across Europe in the approach towards digital competences at primary and secondary level educational systems, with most countries treating digital skills as a cross-curricular theme rather than a distinct discipline (EIT Digital, 2022).

Socio-Demographic Disparities and the Digital Divide

The digital divide in Europe is both a geographical and socio-demographic phenomenon. Eurostat data reveal that in 2023, 55% of people in the EU aged 16 to 74 had at least basic overall digital skills, with rates ranging from 83% in the Netherlands to 28% in Romania (Eurostat, 2024). The level of formal education is a critical determinant: the gap in basic digital skills between highly educated individuals (80%) and those with no or low formal education (34%) in the EU stood at 46 percentage points (Eurostat, 2024). These disparities are further exacerbated by age, income, and occupation, with adults in manual occupations and rural areas most at risk of digital exclusion (Joint Research Centre, 2025).

A comprehensive review by Cedefop concludes that the digital divide is alive and well. A strikingly high share of the EU adult workforce is still employed in a semi-analogue world, at the same time that others are faced with technological obsolescence. Reaping the full benefits of digitalisation will require modernisation of education and training systems but, crucially, more investment in digital capital infrastructure and continuing online learning for groups excluded from the digital economy (Cedefop, 2022).

The literature further distinguishes between different levels of the digital divide: the first level (material access), the second (skills and uses), and the third (outcomes of differentiated access and use). As noted in a recent review, the persistence of the gap at all three levels is evident, especially during the COVID-19 pandemic, which confirmed the need for accelerated and adequately managed digital transformation.

Gender Gap and Underrepresentation in Digital Professions

Gender disparities remain a persistent and well-documented challenge in the digital sector. According to the European Commission, there are four times more men than women in Europe with ICT-related studies, and the share of men working in the digital sector is 3.1 times greater than the share of women (European Commission, 2021). The underrepresentation of women is also reflected in digital entrepreneurship and leadership positions, with female-owned start-ups more likely to be successful, yet facing barriers to participation, leadership, and investment in the entrepreneurial digital sector (European Commission, 2021).

Binder observes that the share of women among ICT specialists in the EU remains low, and girls and women are underrepresented in digital studies and careers, despite targeted policy interventions (Binder, 2025). The persistence of unconscious biases and structural barriers underscores the need for systemic, multi-level interventions, as highlighted by Bacigalupo and colleagues, who argue that greater diversity in digital professions is associated with higher levels of innovation and competitiveness, yet systemic barriers continue to limit women's participation (Bacigalupo et al., 2016).

Lifelong Learning, Upskilling, and Motivation

The imperative for lifelong learning is widely recognized, yet participation in upskilling and reskilling initiatives remains uneven. As stated by the EIT Digital report, Europe needs educational systems fit for the digital age, alongside supplementary programs to train and retrain that part of the adult population which has long left their studies behind. It is a two-sided challenge, concerning both basic digital skills and specialised skills needed for European firms and organisations (EIT Digital, 2022). However, barriers such as limited access to training, lack of motivation, and inadequate recognition of informal and non-formal learning persist (Bocconi et al., 2022).

Hammoda and Foli emphasize that digital competence is not a static attribute but requires ongoing investment in learning, reflection, and adaptation to technological change, and that the development of digital competence frameworks must be accompanied by strategies to motivate learners, validate diverse learning pathways, and ensure that upskilling opportunities are accessible to all (Hammoda & Foli, 2024).

Shortage of Advanced Digital Skills and Emerging Competencies

While basic digital skills are essential, the shortage of advanced digital experts - particularly in fields such as artificial intelligence, data science, and cybersecurity - poses a major risk to Europe's innovation capacity. As highlighted by Bauch, there remains a significant gap in the availability of qualified talent, particularly in emerging fields such as artificial intelligence and cybersecurity (Bauch, 2024). The Digital Compass targets 20 million employed digital specialists by 2030, but projections suggest that only 13.3 million digital specialists will be employed by 2030, short 6.7 million from the target (EIT Digital, 2022).

Audrin's research demonstrates that the framework for digital skills at work must extend beyond basic proficiency to encompass critical inquiry, responsibility, and the ability to adapt to new digital contexts (Audrin, 2024). The need for industry-aligned, flexible, and innovative training pathways is echoed across the literature (European Commission, 2025; Binder, 2025).

Assessment, Certification, and Validity of Measurement

The proliferation of digital competence frameworks has not always been matched by rigorous assessment tools. As noted in a systematic review, few procedures to

guarantee the validity and reliability of digital competence questionnaires were identified, and the instruments are mainly self-assessment statements and closed-ended questions (Education and Information Technologies, 2022; Correira et al., 2024). The European Commission has launched digital skills self-assessment tools, available on Europass and the Digital Skills and Jobs Platform, to help learners and professionals understand their level of digital skills and identify areas for upskilling (European Commission, 2021).

Hammoda and Foli argue that the development of valid, reliable, and portable instruments for assessing digital competence is a critical challenge, and there is a need for standardized, evidence-based approaches to certification (Hammoda & Foli, 2024). The emergence of micro-credentials and digital badges offers new opportunities for recognition, but also raises questions about comparability and employer acceptance (Cedefop, 2022; Talukder et al., 2024).

Pedagogical and Institutional Barriers

Pedagogical innovation and institutional support are essential for effective digital competence development. As highlighted in a recent mixed-methods study, barriers are often compounded by contextual challenges, such as limited access to resources, inadequate training, and insufficient institutional support (Al-Furaih & Al-Awidi, 2018; Cheah et al., 2023). Even in well-resourced institutions, teachers may struggle to integrate technology due to a lack of tailored professional development and alignment with curricular needs (Howard & Mozejko, 2015; Sánchez et al., 2011).

The literature emphasizes that structured professional development programs are directly linked to increased digital readiness, and that the support of school leadership, alongside a structured framework for training, ensures that teachers are not only confident but also equipped to leverage digital tools in a meaningful way (Koehler & Mishra, 2009; Tondeur et al., 2017).

The Need for Data-Driven Monitoring, Evaluation, and Policy Adaptation

A robust, data-driven approach to monitoring and evaluation is essential for closing the digital skills gap. As Hammoda and Foli state, regular collection and

analysis of digital skills indicators, as well as qualitative feedback from learners and educators, are crucial for ensuring that initiatives remain relevant and effective (Hammoda & Foli, 2024). The diversity of frameworks and variability in methods can create confusion and hinder policy coherence, underscoring the need for harmonized evaluation strategies and meta-frameworks (Oberländer et al., 2020).

Best Practices and Innovative Approaches in Digital Competence Development

In recent years, the European Union has become a fertile ground for the emergence of innovative strategies and best practices aimed at fostering digital competence across diverse educational and professional contexts. The evolution of these practices reflects not only the need to align with pan-European frameworks such as DigComp, but also the necessity to adapt to local realities, stakeholder needs, and the rapidly shifting technological landscape (European Commission, 2022; Vuorikari et al., 2022).

A defining feature of the most successful initiatives is their commitment to inclusivity and adaptability. For instance, the widespread adoption of the DigComp framework has enabled Member States to design curricula, assessment tools, and certification systems that are both standardized and flexible. This dual approach allows for the harmonization of digital skills development across Europe while also accommodating the specificities of national education systems and labor markets (Cedefop, 2022; Baroni et al., 2019). In Spain, the integration of self-assessment tools such as SELFIE and SELFIEforTEACHERS has empowered schools to evaluate their digital maturity and implement targeted improvement plans, fostering a culture of continuous professional development among educators (Bocconi et al., 2022).

Teacher training emerges as a cornerstone of digital innovation in education. Recent empirical studies have demonstrated that structured professional development programs, particularly those aligned with the DigCompEdu framework, significantly enhance teachers' digital pedagogical skills and their capacity to integrate technology into classroom practice (Cheah et al., 2023; Zhang et al., 2024). These programs often combine peer mentoring, collaborative design workshops, and ongoing support

networks, creating environments in which educators can experiment with new methodologies and share best practices (Baroni et al., 2019; Bulto et al., 2025).

Beyond formal education, non-formal and lifelong learning pathways have proven essential in bridging digital skills gaps, especially among adults, jobseekers, and marginalized groups. The rise of micro-credentials and digital badges has made it possible to recognize and validate digital competences acquired outside traditional educational settings, thus supporting career transitions and fostering employability (Cedefop, 2022; European Commission, 2023; Marsinah et al., 2024). The European Digital Skills Certificate (EDSC) initiative exemplifies this trend, offering a standardized, EU-wide certification that is valued by both employers and educational institutions.

Transnational collaboration is another hallmark of effective digital competence development. The VEHUB4YOU project, for example, has established a network of virtual business hubs across countries such as Ukraine, Azerbaijan, Italy, and Latvia, providing young people with opportunities for entrepreneurial learning, mentorship, and cross-border collaboration. These hubs leverage digital platforms to facilitate international exchanges, project-based learning, and real-world business simulations, which have been shown to boost motivation, digital literacy, and entrepreneurial skills among participants (Pinto et al., 2021).

Inclusivity remains a guiding principle in the design and implementation of best practices. Research indicates that targeted interventions - such as digital training programs for teachers and students in rural or underserved areas, and digital platforms tailored to the needs of migrant and refugee youth - can significantly reduce educational inequalities and support social integration (Fernández-Arias et al., 2025). In these contexts, technology is not merely a tool for content delivery, but a means to foster active participation, intercultural dialogue, and the creation of supportive learning communities (Judijanto et al., 2024).

The importance of evidence-based policy and continuous evaluation is widely recognized. Longitudinal studies, such as the ySKILLS project, have provided valuable insights into the development of digital skills among European youth, highlighting both

progress and persistent challenges (Machackova et., 2024). Systematic reviews and bibliometric analyses further inform the refinement of strategies and the dissemination of effective models across regions (Education and Information Technologies, 2022).

In summary, best practices in digital competence development across Europe are characterized by their integration of pedagogical innovation, inclusivity, transnational collaboration, and responsiveness to evolving learner needs. The ongoing challenge is to scale these approaches sustainably, ensuring that every citizen has equitable access to the opportunities of the digital age.

Strategic Recommendations and Future Perspectives for Digital Competence Development in the EU

The rapid evolution of digital technologies and the increasing centrality of digital competence in economic, educational, and social spheres require the European Union to adopt forward-looking, evidence-based strategies. While significant progress has been achieved through frameworks such as DigComp and the Digital Education Action Plan, the literature and recent policy analyses highlight the need for a more integrated, inclusive, and adaptive approach to digital skills development (European Commission, 2022; Cedefop, 2022).

Towards a Unified and Adaptive Framework

A recurring theme in both academic and policy discourse is the importance of coherence and adaptability in digital competence frameworks. As recent comparative analyses have shown, the evolving landscape of digital competences in the EU, EC, and UNESCO recommendations reveals both commonalities and differences in conceptualisation, suggesting the need for a unified framework that can guide educational policies and practices. This is particularly pertinent as Member States continue to tailor DigComp to their national contexts, sometimes resulting in fragmentation or misalignment with labor market needs (Cedefop, 2022; Vuorikari et al., 2022).

To address this, scholars recommend greater coordination between EU-level and national strategies, with mechanisms for regular review and updating of frameworks to reflect technological advances and societal change (Baroni et al., 2019). The

integration of digital, entrepreneurial, and transversal skills - such as critical thinking, creativity, and ethical awareness - should be prioritized to ensure that digital competence remains relevant and future-proof (Bacigalupo et al., 2016; Pinto et al., 2021).

Scaling Best Practices and Fostering Innovation

The scaling and transferability of best practices remain critical challenges. Evidence from recent EU projects demonstrates that transnational collaboration, peer learning, and the sharing of innovative models - such as virtual business hubs and micro-credentialing platforms - can accelerate digital inclusion and convergence growth rates among EU countries. Policymakers are urged to invest in platforms and networks that facilitate the dissemination and adaptation of successful interventions, especially in regions with lower digital maturity (Digital Skills and Jobs Platform, 2025).

Moreover, the literature stresses the value of practice-based learning, project-based activities, and real-world challenges in digital competence development. As Juhász et al. (2022) notes, practical activities have a significant role in development, and the use of digital tools in authentic contexts is essential for meaningful learning outcomes. Embedding such approaches in both formal and non-formal education can help bridge the gap between digital potential and actual skills use.

Ensuring Inclusion and Equity

Ensuring that no one is left behind is a core principle of the EU's digital strategy (European Commission, 2020). Persistent gaps - whether related to gender, geography, age, or socio-economic status - require targeted, context-sensitive interventions. Research highlights the need for inclusive design in digital competence programs, with special attention to marginalized groups, rural communities, and individuals with low formal education (Eurostat, 2024; Fernández-Arias et al., 2025).

This includes supporting teachers and trainers with ongoing professional development, accessible resources, and peer networks (Bocconi et al., 2022). It also means investing in digital infrastructure and connectivity, particularly in underserved

regions, and developing flexible pathways for upskilling and recognition of prior learning (Cedefop, 2022; European Commission, 2023).

Advancing Assessment, Certification, and Data-Driven Policy

The proliferation of digital competence frameworks must be matched by robust, valid, and portable assessment and certification systems. The European Digital Skills Certificate (EDSC) and similar initiatives represent important steps, but further harmonization and employer recognition are needed (European Commission, 2023; Cedefop, 2022). The literature calls for evidence-based approaches to certification, leveraging both self-assessment and performance-based measures, and ensuring that micro-credentials are transparent and widely accepted (Education and Information Technologies, 2022).

Data-driven monitoring and evaluation are essential for policy adaptation and continuous improvement. Regular collection and analysis of digital skills indicators, along with qualitative feedback from learners and educators, can help ensure that strategies remain relevant and effective (Hammoda & Foli, 2024; Joint Research Centre, 2025).

Embracing Future Trends: AI, Sustainability, and Global Collaboration

Looking ahead, digital competence policy must anticipate and respond to emerging trends such as artificial intelligence, data ethics, and sustainability. The integration of AI literacy, computational thinking, and digital citizenship into competence frameworks is increasingly advocated in both research and policy (Wing, 2006; Liu & Dang, 2020). Furthermore, the intersection of digitalization and sustainability is gaining prominence, with the European Digital Agenda emphasizing the need for a digital future that improves people's lives and boosts economic growth, while ensuring that nobody is left behind.

Global collaboration - both within and beyond Europe - will be crucial for sharing knowledge, resources, and innovative models. International initiatives, such as UNESCO's Digital Literacy Global Framework, provide valuable reference points and opportunities for mutual learning (UNESCO, 2024).

In conclusion, the future of digital competence development in the European Union depends on the ability to combine strategic vision with operational flexibility, inclusivity, and a commitment to continuous learning and innovation. By building on existing frameworks, scaling best practices, and fostering a culture of collaboration and evidence-based policy, the EU can ensure that digital transformation serves as a driver of sustainable growth, social cohesion, and individual empowerment.

Case Studies and Comparative Insights: Digital Competence and Entrepreneurship in International Virtual Exchanges.

The practical application of digital competence frameworks and entrepreneurial education is most effectively illustrated through the analysis of international case studies. The VEHUB4YOU project, as documented in the consortium's deliverables, provides a salient example of how virtual exchanges can be leveraged to foster both digital and entrepreneurial skills among youth in diverse socio-economic and cultural contexts.

The VEHUB4YOU Project as a Transnational Model

The VEHUB4YOU initiative was developed to address the dual challenge of digital skills deficits and limited entrepreneurial opportunities for young people in Italy, Ukraine, Azerbaijan, and Latvia. Through the establishment of a network of Virtual Youth Business Hubs, the project created a transnational infrastructure that enabled business education, mentorship, and collaborative peer learning. Each hub utilised digital platforms to facilitate synchronous and asynchronous exchanges, business simulations, and project-based learning, thereby supporting the development of both digital literacy and entrepreneurial thinking in authentic, cross-border settings.

Italy: Methodological Innovation and Curriculum Integration

The Italian contribution to VEHUB4YOU was characterised by the development of methodological materials and online training programmes tailored to secondary and tertiary students. Italian partners placed particular emphasis on the integration of digital tools into business curricula, the adoption of case-based learning, and the contextual adaptation of the DigComp and EntreComp frameworks. This approach enabled Italian

hubs to bridge the gap between theoretical knowledge and practical entrepreneurial experience, especially for students from non-economic backgrounds (Bacigalupo et al., 2016).

Ukraine: Empowerment through Rural and Community-Based Hubs

In Ukraine, the establishment of virtual business hubs in schools and libraries was instrumental in providing access to digital resources and entrepreneurial education for youth in rural and underserved areas. The Ukrainian experience demonstrates how virtual exchanges can mitigate geographical and economic barriers, promoting inclusion and economic empowerment in regions facing significant socio-political challenges (Bocconi et al., 2022).

Azerbaijan: Addressing Urban-Rural Disparities

Azerbaijan's implementation of the VEHUB4YOU model focused on bridging pronounced urban-rural disparities in access to entrepreneurship training. By embedding virtual exchanges within educational institutions and community centres, Azerbaijani partners expanded the reach of business education, promoted digital literacy, and stimulated entrepreneurial activity in regions with varying levels of digital infrastructure (Cedefop, 2022).

Latvia: Digital Innovation and International Collaboration

Latvia's longstanding investment in digital education positioned it as a leader in content creation and the facilitation of international exchanges. Latvian hubs prioritised the development of digital learning platforms, teacher training, and cross-cultural dialogue. This case illustrates how sustained national investment in digital infrastructure and educator capacity building can amplify the impact of transnational projects and accelerate the adoption of best practices (Vuorikari et al., 2022).

Cross-Case Analysis and Policy Implications

Several cross-cutting themes emerge from the comparative analysis of these national experiences. First, the adaptability of the DigComp and EntreComp frameworks was critical for contextualising digital and entrepreneurial competence development. Second, the use of virtual exchanges and blended learning environments proved effective in engaging diverse learner populations, including those in marginalised or rural settings (Pinto et al., 2021). Third, ongoing professional

development for educators and the creation of supportive peer networks were essential for sustaining innovation and scaling impact (Baroni et al., 2019; Bocconi et al., 2022).

These findings underscore the importance of flexible, context-sensitive models that combine digital infrastructure, pedagogical innovation, and cross-sector collaboration. As highlighted in the literature, the most effective digital competence initiatives are those embedded within broader ecosystems of support, where policy, practice, and research interact in a continuous cycle of improvement (Cedefop, 2022; European Commission, 2022).

Conclusions and Future Directions

The evidence and analyses presented in this chapter confirm that digital competence is now a foundational pillar for citizenship, employability, and entrepreneurial capacity in the European Union. Over the past decade, significant progress has been achieved through the development and dissemination of frameworks such as DigComp and EntreComp, as well as through ambitious policy initiatives including the Digital Education Action Plan and the Digital Decade targets (European Commission, 2022; Bacigalupo et al., 2016). These instruments have provided both a shared language and a strategic vision, enabling Member States to align their educational systems and labour markets with the demands of an increasingly digital society.

Nevertheless, persistent gaps and challenges remain. Socio-economic disparities, gender imbalances, and geographic inequalities continue to shape access to digital skills and opportunities. The literature consistently highlights that individuals from rural areas, lower socio-economic backgrounds, and underrepresented groups are less likely to benefit fully from digital transformation, underscoring the need for targeted and inclusive interventions (Cedefop, 2022; Eurostat, 2024). The COVID-19 pandemic has further exposed vulnerabilities in digital infrastructure, pedagogical readiness, and the capacity of education systems to ensure equitable access for all learners (Bocconi et al., 2022).

Best practices emerging from transnational projects such as VEHUB4YOU, as well as national and regional initiatives, demonstrate the value of flexible, context-sensitive approaches. The adaptability of frameworks like DigComp and EntreComp

has facilitated their integration into diverse educational and professional settings, while the proliferation of virtual exchanges, blended learning environments, and micro-credentialing schemes has expanded opportunities for lifelong learning and skills recognition (Pinto et al., 2021).

Looking forward, the future of digital competence development in the EU will depend on several key priorities. First, there is a need to ensure ongoing coherence and adaptability in competence frameworks, allowing them to respond to technological advances and evolving labour market needs (Baroni et al., 2019; Vuorikari et al., 2022). Second, scaling and transferring innovative practices - such as virtual business hubs and project-based learning - will be essential for reaching learners in regions with lower digital maturity and for fostering entrepreneurial mindsets. Third, inclusion and equity must remain at the core of all strategies, with particular attention to supporting teachers, learners in marginalized communities, and those facing barriers to participation (Cedefop, 2022; Bocconi et al., 2022).

Finally, robust assessment, certification, and data-driven policy evaluation will be crucial for tracking progress and informing adaptive responses. As digital technologies continue to advance, integrating emerging topics such as artificial intelligence, data ethics, and sustainability into digital competence strategies will ensure that the EU remains at the forefront of global innovation and social cohesion (Liu & Dang, 2020).

In conclusion, by building on the achievements to date and addressing persistent challenges through evidence-based, inclusive, and forward-looking approaches, the European Union can empower all citizens to thrive in the digital age.

5.4. Digital entrepreneurship skills

The world is changing. It is no longer just about globalization and internationalization, but about the internal structural restructuring of the economies of countries, reprofiling and changing development vectors. Automation, the emergence of artificial intelligence, changes in the structure and size of the population, and the

improvement of technological processes require specialists who can quickly adapt to these changes. Ukraine, which, among other things, is already preparing for post-war reconstruction, is especially experiencing these changes. The issues of developing priority sectors of the economy, the rapid restoration of economic growth, European integration, and training specialists who will be able to implement the planned are acute.

Entrepreneurship in the broad sense is inextricably linked with the idea of social progress, because it is entrepreneurial activity that acts as a driving force for innovation, technological development, and socio-economic changes. In the conditions of the Fourth Industrial Revolution, digital technologies have become a key factor in the development of entrepreneurship, which not only change the ways of organizing business processes, but also form new models of creating innovative value. The digital environment today serves as the optimal space for implementing entrepreneurial ideas, implementing technological solutions, and building global business ecosystems.

In the context of the rapid digital transformation of the Ukrainian economy, when digital technologies cover all spheres of public life, it is the formation of digital entrepreneurial skills that becomes a crucial prerequisite for employment, competitiveness and sustainable business development.

Thus, according to the Ministry of Digital Transformation from December 2023, 93% of the adult population of Ukraine (18-70 years old) have digital skills. Almost 60% of them have basic and advanced skills, but 15.1% of Ukrainians do not have them at all, and another 37.9% have a low level. Digital literacy is best developed among young people (10-17 years old), where 95% have digital skills. Overall level: 93% of the adult population of Ukraine aged 18–70 have digital skills. In addition, 99% of people with hearing impairments aged 18–59 have digital skills (Ministry of Digital, 2023).

As for young people, researchers in their studies question the level of their skills and note that although young people are often considered digital experts, most of them do not have enough of these competencies necessary to start their own entrepreneurial business or fill jobs where there is a need for advanced digital skills (Vucekovic and ec, 2020). Thus, the insufficient level of formation of digital entrepreneurial skills

becomes a barrier to business development, integration into global digital ecosystems and realization of the potential of innovative entrepreneurship. Therefore, research into the essence, structure and mechanisms of formation of digital entrepreneurial skills is timely and has important theoretical and practical significance. And their absence limits the ability of entrepreneurs to effectively use digital tools for analytics, marketing, innovation, interaction with partners and consumers.

Thus, the study of digital entrepreneurial skills is extremely relevant in the context of Ukraine's European integration, the development of the digital economy and the formation of an innovative culture of entrepreneurship, which meets the strategic priorities of sustainable development and digital transformation of society.

In the European context, the formation of entrepreneurial competence is defined by the EntreComp Framework, and digital competence is defined by the DigComp 2.1 Framework, which is interpreted as the ability to confidently, critically and safely use digital technologies for learning, work and communication. In the Ukrainian space, these provisions are adapted in the Digital Competence Framework of Citizens of Ukraine (DigCompUA), which emphasizes the need to possess digital skills in the field of information literacy, content creation, cybersecurity and digital communication. However, despite the presence of normative definitions of digital competence of citizens, there is no holistic justification of the essence of the digital competence of an entrepreneur, which integrates the components of entrepreneurial and digital competences into a new quality - digital entrepreneurial skills.

The research on the general aspects of the formation of digital entrepreneurship and digital business, digital competencies produced by higher education is associated with the names of Dorn, Jürgen (2007)., Pichlmair, Markus. (2007), Ioannis Sitaridis (2024);Fotis Kitsios (2024); Judith Helmer (2024), Selin Kozat, Leonie Pöter (2024), Evgenii Shtofblat (2024), Neele Wolff (2024), Laura Daniel (2024), Kolb, D.A. (2015), Kraus, N. (2021), Kraus, K (2021), Andrusiak, N. (2021), Nabi, G (2017)., Liñán, F (2017), Fayolle, A (2017), Krueger, N. (2017), Walmsley, A. (2017) and others.

But, at the same time, a significant number of problematic issues listed above and, for example, the issue of developing a university ecosystem for the formation of digital

entrepreneurial skills remain insufficiently researched and require in-depth study. At the same time, the simultaneous application of the existing EntreComp and DigComp frameworks does not allow to fully reveal the essence of digital entrepreneurial competence, since there are no logically consistent connections between them. This necessitates the need for scientific substantiation of the essence of digital entrepreneurial skills, which would describe their content, components and levels of formation, determine methodological approaches to their development in the educational and business environment, ensure their implementation in educational programs through various forms and levels of education, which determines the main goal of this study.

Entrepreneurship education has long been considered one of the most powerful topics due to its function in combining ideas and practices. The combination of new computerized developments (e.g. online media, massive online courses, Internet of Things, big data, 3D printing, etc.) that are affecting society worldwide emphasizes the idea of entrepreneurship and influences entrepreneurial activity (Singh, 2023). Entrepreneurial competencies related to digital literacy (tools, data, platforms), business thinking (business model, monetization), digital marketing, analytics, legal/ethical knowledge, flexibility and the ability to collaborate remotely are increasingly recognized as key professional skills for navigating the 21st century workplace (Helmer, 2024). Digital entrepreneurial skills are best developed through a combination of the following elements: competency frameworks; practice-oriented learning (projects, hackathons, incubators); online/hybrid tools (MOOC, simulations); mentoring and assessment of competencies. (Sitaridis, 2024).

Let's start by exploring the essence of the competency framework. Our task is to clarify the conceptual apparatus (to generalize the essence of the concepts of «competence», «competence»), since it is this that is the basis for further research; and to highlight digital entrepreneurial competencies.

Thus, researchers are of the opinion that the terms «competence» and «competence need to be distinguished. In general, S.V. Leiko (2013) and M.S. Golovan (2011), relying on previous research and regulatory documents, prove that

«competence is associated with a certain type of activity, while competence is associated with a personality, with its internal qualities and abilities. Competence is the property of the individual himself, determines the qualitative level, assimilation as a result of training, knowledge, skills and the ability to apply them, based on one's own experience, in the process of carrying out a certain activity» (Leiko S.V., 2013). That is, «competence is manifested in the competence successfully implemented in the activity and includes a personal attitude to the subject and product of the activity» (Golovan M.S., 2011).

Thus, Dorn Jürgen and Markus Pichlmair note that «knowledge forms the skills necessary to perform professional tasks (for example, business process management, software development or other engineering tasks)» (Dorn, Jürgen & Pichlmair, Markus. (2007).

Investigating the meaning of the concept of «skills», Kraus N.M. turned to the model of fundamental skills of the digital economy (New Foundational Skills of Digital Economy), developed by the Burning Glass company, formed on the basis of 4 blocks within which the corresponding lists of fundamental skills are determined (Kraus, 2021).

– personal skills (Human Skills) – critical thinking, creativity, analytical reasoning, communication and collaboration;

– basic knowledge in areas of activity (Domain Knowledge) – strategy, economics, marketing, communications/public relations, talent development/human resource management, research and development;

– digital skills (Digital Building Block Skills) – data analysis, BigData and data management, software development, information security;

– business sales skills (Business Enabler Skills) – project management, decision-making, data visualization and communication.

This model is distinguished by the levels of competence development. Thus, the first level is the basic competencies (Baseline Competencies) that provide the opportunity to understand and navigate a wide variety of roles, problems and opportunities. They form a platform on which you can accumulate additional

experience to develop new competencies and obtain qualifications for more technically advanced jobs in the future.

The second level includes the core competencies (Core Competencies) based on basic competencies and necessary for obtaining higher-paying jobs in more specialized areas. Unlike basic competencies, which are less likely to change dramatically in the near future, key competencies develop over time, which requires constant learning throughout your career.

The third level is the distinguishing competencies (Distinguishing Competencies) Competencies are highly valued abilities by practitioners, often learned within a specific department or industry. They are based on core and core competencies, but they are most valuable primarily because of their small offering and the capabilities that enable teams and organizations to solve extremely complex tasks (Kraus, 2021).

Based on establishing a logical relationship between the above categories of different areas, we will establish the interdependence between them, and establish the place of entrepreneurial competencies and skills in this interdependence (Fig. 5.2).

Skills are used to document a person's abilities and knowledge in a skills profile (Dorn, Jürgen & Pichlmair, Markus. (2007).

That is, «competence» is a more complex skill, the characteristics of which should be understood equally by everyone (both employers and teachers and students). Competence management is the systematic development of human resources and the formed competence management system should support this systematic development.

Competences consist of four components, which are called knowledge, skills, attitudes and capabilities. In general, they can be described as follows:

- practical competence (the demonstrated ability of a higher education student to perform a set of tasks);

– fundamental competence (the demonstrated understanding of what and why the task is performed);

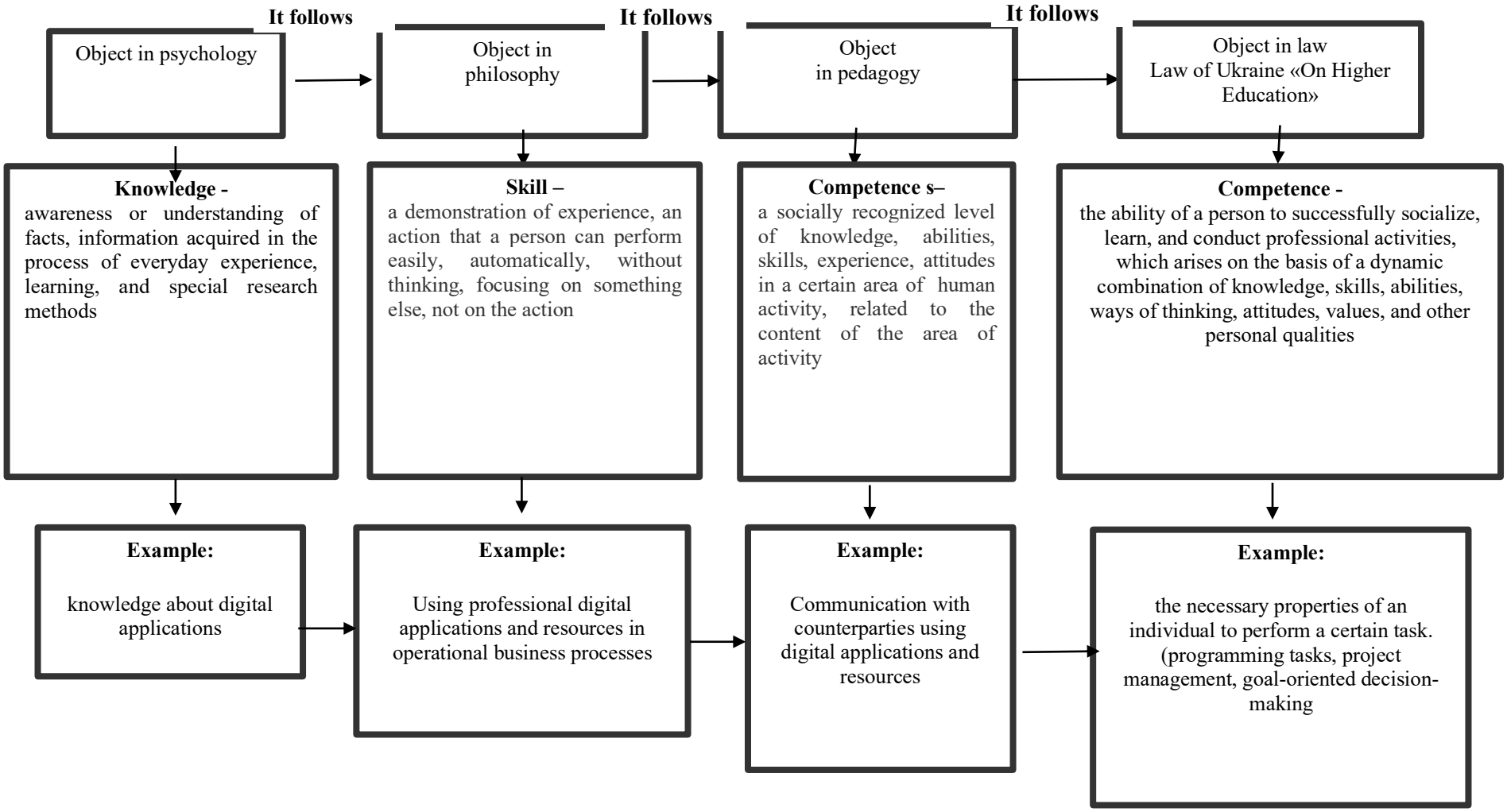

Fig. 5.2. The place of knowledge, skills, competencies and competences in the composition of research objects

– reflective competence (the ability to integrate actions with understanding of actions so that the higher education student learns and adapts to changes);

– applied competence (the demonstrated ability of the student higher education to perform a number of tasks with understanding and reflexivity) (Dorn, Jürgen & Pichlmair, Markus. (2007).

As for competencies, their formation is influenced by the competencies themselves. The level of professional, special knowledge that corresponds to the competence, the degree of development of the subject's personal qualities is a prerequisite for its successful implementation in the professional sphere. Thus, the concepts of «competence» and «competence» are interconnected and mutually conditioned, but not identical to each other (Holovan M.S., (2017).

The established relationship between the categories of «knowledge», «skills», «competence» and «competence» made it possible to establish that competence is the result of the practical application of knowledge and skills in practice in order to perform professional duties.

So, it is competencies that are the basis for the development of professional standards, which clearly trace the levels of knowledge, skills, abilities necessary for the performance of professional duties, as well as possible measurement criteria for assessing the competence of individual achievements. Therefore, the issue of management and assessment of competencies is being returned to today both at the university level and at the state level, since it is the acquired competencies that characterize the qualitative indicator of education.

Taking into account today's challenges, the Ministry of Digital Transformation, in accordance with the Resolution of the Cabinet of Ministers of Ukraine dated March 3, 2021 No. 67-r On Approval of the Concept of Digital Competence Development and Approval of the Action Plan for Its Implementation, has developed a draft Description of the Digital Competence Framework for Entrepreneurs of Ukraine. The basis is the Ukrainian Digital Competence Framework for Citizens of Ukraine (DigCompUA), which is an adapted version of the European conceptual and reference model of digital competences for EU citizens (DigComp 2.1: The Digital Competence Framework for

Citizens), the EU Entrepreneurship Competence Framework (EntreComp), and also takes into account the results of research and recommendations in the field of digital and entrepreneurial competence from Ukrainian, European and international institutions (Fedorov M., 2021). Thus, the Framework identifies five main areas of digital competence in the process of entrepreneurial activity, namely:

Area 1. Working with information and data in the digital environment in the process of entrepreneurial activity.

Area 2. Using professional digital applications and resources in operational processes of entrepreneurial activity.

Area 3. Business communication and interaction in the digital environment in the process of entrepreneurial activity.

Area 4. Security in the digital environment in the process of entrepreneurial activity.

Area 5. Digital transformation of business and professional development.

Let us list, in our opinion, the main ones (Table 5.2).

Table 5.2. Names and descriptors of digital competencies of an entrepreneur

Digital competence area in the process of entrepreneurship	Competence	Skill
Working with information and data in the digital environment in the process of entrepreneurship	Information/digital content search for business idea generation, risk assessment and business development	Ability to formulate information needs, search for information and data in the digital environment for starting and developing a business
	Critical evaluation, analysis and interpretation of data and information in the digital environment for entrepreneurial activities.	Ability to check the reliability of sources of digital content necessary for doing business, in the process of searching for information and data for generating business ideas and developing a business. Ability to verify sources of information and data in the digital environment according to basic criteria
	Data and digital content management in the process of entrepreneurial activity	Ability to select, store/accumulate and structure information and data in digital environments when carrying out entrepreneurial activity using relevant software and corporate content management systems
Using professional digital	Using professional digital applications and tools for analyzing and assessing	Ability to use digital business analytics tools: software tools that, using data from one or more business systems, combine them in a repository

applications and resources in the process of entrepreneurial activity	the effectiveness of entrepreneurial activity	
	Using digital technologies and digital infrastructure for business/enterprise management	Ability to use digital technologies and resources to perform internal technical, communication, and management tasks in the process of operational business/enterprise management.
	Using digital technologies to create a final product/service in entrepreneurial activity	Ability to apply digital technologies for the production of products/services. It implies understanding the feasibility and ability to use the necessary digital resources/technologies to meet the needs of the target consumer of the business product/service.
Business communication and interaction in the digital environment in the process of entrepreneurial activity	Business communication and interaction in the digital environment	Using online communication tools (chat bots, instant messengers, email newsletters), as well as the ability to use digital technologies at the time of selling products/services to a client/business partner.
	Collaboration in the business environment using digital technologies	Application of digital technologies and tools for collaboration, co-creation and development of digital resources, knowledge and services in business environments.
	Dissemination of information about the final product of entrepreneurial activity using digital technologies	Ability to use digital technologies when promoting a product/service on the market. Includes understanding and basic mastery of all digital marketing tools, as well as continuous professional development - readiness to quickly adapt to changes.
Security in the digital environment in the process of entrepreneurial activity	Protection of computer devices and secure connection to the Internet in the process of entrepreneurial activity	Ability to ensure protection of digital devices and resources of the enterprise from the use of malicious software, cyberattacks and other harmful external influences in the digital environment.
	Protection of personal data and privacy in the digital environment in the process of communication	Ability to ensure protection of carriers/owners of digitized information from malicious use during its transmission/transfer to other external stakeholders in the process of entrepreneurial activity.
Digital business transformation and professional development	Digitalization of business processes. Initiative in finding innovative technological solutions	Implementation of modern technologies into the business processes of the enterprise with an approach that involves not only the installation of modern equipment or software, but also fundamental changes in approaches to management, corporate culture, and external communications.
	Lifelong learning and professional development in a digital environment	The ability to use available/open digital educational resources (trainings, courses, educational programs) for one's own professional development and staff development, to improve professional practices, to seek opportunities for development and further training of staff in a digital environment.

Source: (Fedorov, 2021)

Thus, Table 5.2 provides a description of the knowledge and skills needed to be entrepreneurial and create financial, cultural and social value for others (Fedorov M., 2021).

The mechanism that allows you to master the tasks and skills set, to master the necessary competencies is practice-oriented learning (projects, hackathons, incubators); online/hybrid tools (MOOC, simulations).

We will describe this mechanism using the example of the participation of the Kyiv National University of Technologies and Design in international and grant activities directly related to the development of entrepreneurial skills, including digital ones.

Thus, one of such projects is the ERASMUS-EDU-2021-VIRT-EXCH – VEHUB4YOU (International Network of Virtual Youth Business Hubs) project (International educational projects).

The main goal of the project: transfer of business knowledge from the EU to youth from the Eastern Partnership countries (including high school students, students of schools, colleges and universities), through virtual exchange technologies; development of entrepreneurial skills; creation of virtual business hubs; facilitation of online courses, adaptation of educational programs. Focused on the age group ~13-30 years. During the project period, KNUTD participated in business trainings with elements of online business simulations, trainings on the development of entrepreneurial competencies, analytical thinking, teamwork and presentation skills, and organized a Professional Development Program (for facilitators) «Use of Information, Communication and Digital Technologies in the Educational Process» with synchronous and asynchronous classes. 60 virtual international business hubs were involved for these events, involving 1,800 participants and 250 facilitators.

Having positive experience in implementing the above-mentioned project, KNUTD joined the K2 Project - SEAL-NR Development of Adaptive Leadership Skills in a New Reality, the purpose of which is to develop, through the use of virtual exchange technologies and the creation of a virtual hub, a system of international cooperation in the field of education between universities and youth organizations from

different countries, focused on youth in general, which will help young people through an interactive online learning system to receive informational and psychological support, develop digital and soft skills for the future, increase awareness of EU policy technologies in the field of entrepreneurship and digital transformation, which in turn will allow to bridge the gap between the requirements of the modern labor market and educational processes and increase the level of mastery of 21st century skills. Project SEAL-NR uses both synchronous and asynchronous virtual exchange (VE) technologies to build 21st century skills among educators and youth. The initiative, targeting 250 tutors and 2,500 young people aged 16 to 30 from diverse socio-economic backgrounds, promotes the development of digital and communication skills, facilitates psychological adaptation to emergencies, and stimulates entrepreneurial activity.

In this project, KNUTD sets the following tasks related to digital skills: improving digital, innovative and smart skills for teachers and employees of the textile and clothing industry in Ukraine and Moldova; creating «smart laboratories» as an educational/training infrastructure. Thus, thanks to project activities, Kyiv National University of Technologies and Design is actively involved in the formation of digital entrepreneurial skills, which requires the active involvement of those interested through activities that simulate real business conditions. Practice-oriented learning, which is implemented through project tasks, hackathons, business simulations, creates space for the development of creativity, analytical thinking and the ability to make decisions in conditions of uncertainty. Not only do learners acquire the tools of the digital economy, but they also gain experience in creating an innovative product, interacting with customers, and working in teams (Lackéus, 2020; Nabi, Liñán, Fayolle, Krueger & Walmsley, 2017).

In parallel, online and hybrid learning formats open up new opportunities for personalized learning and the development of digital competencies. Massive open online courses (MOOC), interactive simulations, virtual labs, and digital collaboration platforms allow for the combination of self-study and practical tasks, ensuring the continuity of the educational process (OECD, 2021; European Commission, 2022).

The integration of practice-oriented methods and digital educational technologies contributes to the implementation of the principle of «learning by doing» which is fundamental in modern entrepreneurship education (Kolb, 2015; Gibb, 2019). This approach ensures the formation of future specialists' ability to innovate, flexible thinking, team interaction and continuous professional improvement – qualities necessary for successful activity in the digital economy.

Each of the components (skill/competence) requires proper assessment and subsequent analysis in order to ensure quality at all levels, since not only universities but also stakeholders who use the acquired competencies are interested in the high-quality implementation of digital entrepreneurial skills.

It is believed that the main approaches to measuring competencies are assessment at the end of training (qualification exam, defense of qualification work, final exam), assessment at the beginning and during training (only this approach makes it possible to manage the process of competence formation, to exercise corrective influence) and assessment in the workplace – competencies can be analyzed only after the employee adapts to the workplace (for example, after six months) (Ilnytskyi D., 2017).

Considering the importance of not just recalculating competencies, but emphasizing the importance of their assessment, since the low level of self-assessment, poor-quality assessment of individual competencies, lead to the fact that employers, as users of competencies, do not have the opportunity to timely and reasonably assess the level of their possession.

Therefore, based on the assessment stages proposed by D. Ilnytsky to ensure the quality of training (determining the purpose and objectives of assessment; choosing a form of assessment (internal, external or self-assessment); choosing assessment tasks (identifying needs, assessment; establishing task assessment criteria; managing the assessment process; determining results, for example, completing tasks, solving cases or tests; providing an assessment of results (quantitative (points or monetary) or descriptive); feedback and further activities or training and blocks of competencies given in the Methodological Guidelines for Technical Assistance for the Development and Use of Competence Models for the Human Resources Development System), we

propose a model for assessing digital entrepreneurial skills and competencies (Fig. 5.3). The model can be expanded by taking into account individual requests, supplementing assessment indicators and their normative values.

Within the framework of modern scientific approaches, the advantages of the system approach as a methodology for studying the activities of business entities, including higher education institutions, are actively recognized.

The system approach allows us to consider all mechanisms that influence the formation, development and assessment of digital entrepreneurial skills in interaction with each other in order to obtain the final product – a high level of mastery of such skills.

One of the most general concepts used to describe objects in systems research is the concept of «system». Thus, the concept of «system» belongs to general and universal interpretations. The interpretation can be applied to various objects, phenomena and processes. The opposite characteristics that define a system as a phenomenon are limitedness and integrity.

Limitedness – describes the external component of the system (while it may not acquire signs of integrity), and integrity - an internal characteristic (the more the system is separated from the internal environment, the more unique and holistic it is).

According to Kovalenko I.I., Bidyuk P.I., Gozhim O.P. (2004) The most «applied» and at the same time quite simple and general is the following definition: a system is a set of elements that are somehow connected and interact with each other to perform specified target functions (Kovalenko I.I., Bidyuk P.I., Gozhim O.P. (2004).

Note that the «set of elements»is transformed into a system under the condition of integrity, structure, hierarchy, and interconnection with the environment. As a holistic system, it is characterized by system functions that include internal and external functions related to the structural organization and that determine the actual performance of a certain function.

Based on the system approach, an analysis of the essence of the application of the eco-approach to ensuring the formation of digital entrepreneurial skills at the Kyiv National University of Technologies and Design was carried out. Using the analysis

method, it is possible to determine the characteristic features of ecosystems within universities.

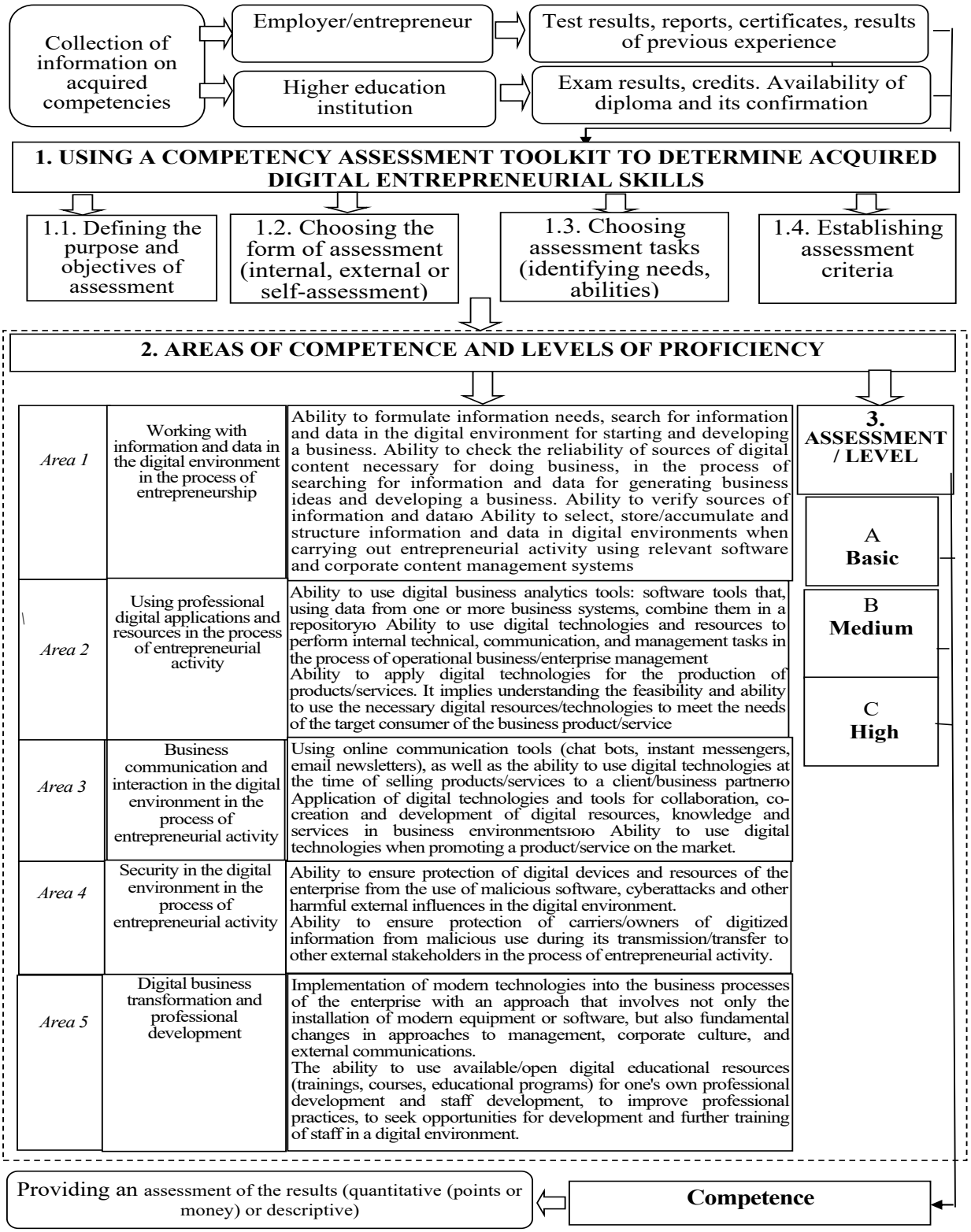

Fig. 5.3. Comprehensive model for assessing digital entrepreneurial competencies

It is believed that the very concept of ecosystem was borrowed by economists from biology - along with the concept of «ecology». In the economic context, both terms are usually used in combination within the framework of the ecosystem approach and are considered as concepts that describe the evolution of the nature of interactions of economic agents, models of their innovative activity and relationships with the operating environment (Fedulova L., 2016).

Assessment of existing interpretations of ecosystems allows us to conclude that they are universal in terms of the level of formation and development: they cover different levels of the system structure (unlike types of systems that have specific boundaries) and provide for their integrated interconnection (Fedulova L., 2016).

Generalization of scientific approaches to the development of ecosystem design allows us to establish that the ecosystem of digital entrepreneurial skills at the Kyiv National University of Technologies and Design can consist of the following main components: organization of educational, scientific, international activities, assessment of the quality of education, development of human resources, application of teaching methods and technologies, external and internal monitoring, which combines them into a single whole and contributes to the management of competencies mastered by higher education students.

The key task of the ecosystem of digital entrepreneurial skills formation at the KNUTD is to create an environment for assessment, development, and improvement of the formation of digital entrepreneurial skills, which, in turn, is manifested through the assessment of acquired competencies. Thus, we believe that when forming an ecosystem for the formation of digital entrepreneurial skills at the Kyiv National University of Technologies and Design, it is worth including: applicants, scientific and scientific-pedagogical workers, administration, and other external and internal stakeholders. In addition, it is worth noting that the effective development of digital entrepreneurial skills in the university environment is possible only if a holistic educational ecosystem is created in which educational, digital, innovative and human resources interact. Such an ecosystem is an open, dynamic system that combines the

educational process, digital infrastructure, entrepreneurial environment and partnerships with business and society.

Thus, taking into account the main properties of the system, such as limitedness, structure, integrity, interdependence with the environment, hierarchy, multiplicity of description, we can form the elements of the ecosystem for the formation of digital entrepreneurial skills at the Kyiv National University of Technologies and Design, which ensured its effective assessment and operational management (Fig. 5.4).

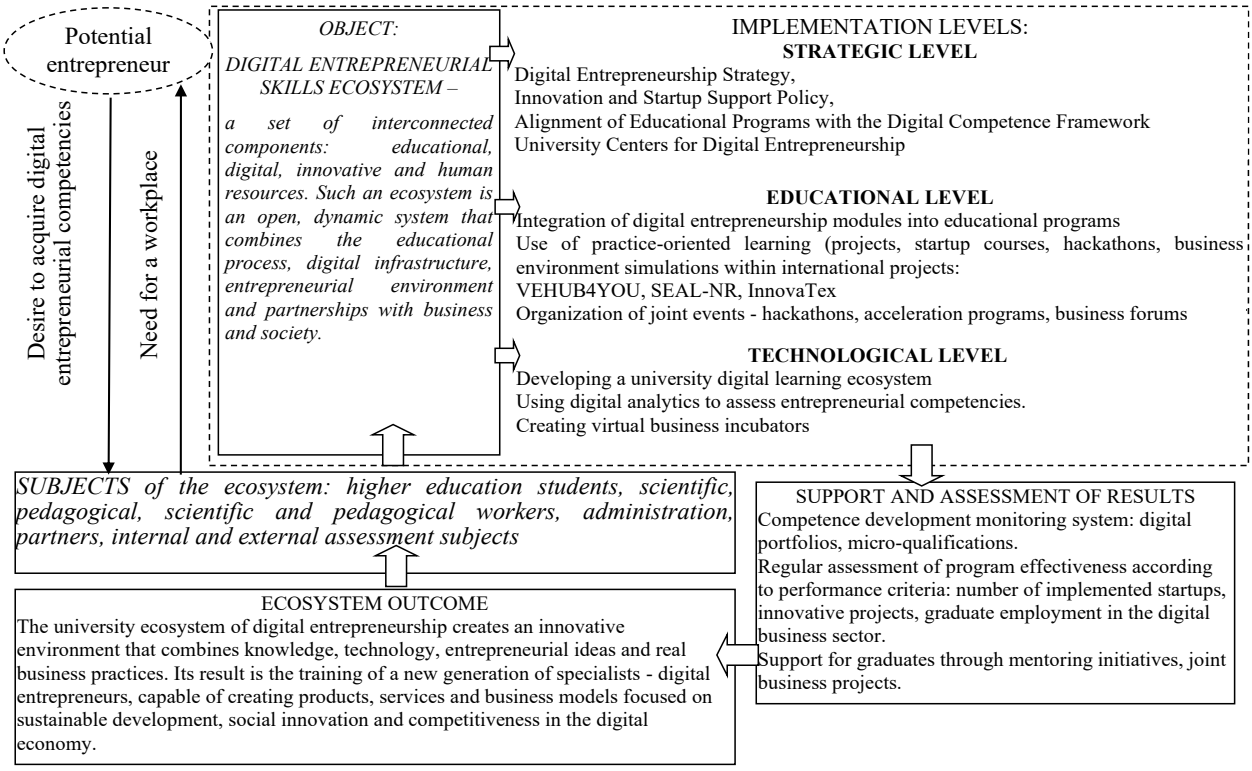

Fig. 5.4. Ecosystem of digital entrepreneurial skills formation at Kyiv National University of Technologies and Design

Based on the results of the research, we have established the elements of the ecosystem for managing university competencies. In particular, the subject, object, tasks, functions, principles, purpose, regulatory and legal regulation were identified, which ensured the effective organization, implementation and definition of measures for managing university competencies and the possibility of assessing the quality of higher education at the domestic, national and international levels.

Thus, it is the ecosystem of the university's digital entrepreneurial skills formation, as an innovative environment that combines knowledge, technologies,

entrepreneurial ideas and real business practices, that will become the key to training a new generation of specialists - digital entrepreneurs capable of creating products, services and business models focused on sustainable development, social innovation and competitiveness in the digital economy. And digital entrepreneurial skills will become a determining factor in training highly qualified specialists needed by the labor market and capable of performing professional tasks at a high level, which will become a determining factor in economic recovery in the post-war reconstruction and strengthen Ukraine's position on the world stage.

CHAPTER 6
ASSESSMENT AND EVALUATION OF VIRTUAL BUSINESS HUBS

6.1. Evaluating the success of virtual hubs

As part of the international project VEHUB4YOU, which aims to develop virtual business hubs as an innovative form of entrepreneurship support, the issue of measuring their impact on the development of participants' entrepreneurial skills is becoming particularly relevant. Digital platforms create new opportunities for learning, communication, and cooperation between representatives of the academic community, business, and the startup environment, ensuring the integration of knowledge and practical experience in a single virtual space. That is why an important scientific and practical issue is to identify key indicators and evaluation systems that allow for an objective measurement of the effectiveness of virtual business hubs and their impact on the development of entrepreneurial potential.

The VEHUB4YOU project aims to create an environment that will help students, young entrepreneurs and startup teams develop the ability to think innovatively, manage risks, plan strategically and interact effectively as a team. In this regard, there is a need to develop comprehensive approaches to monitoring and evaluating the performance of virtual business hubs, covering both quantitative and qualitative parameters. Quantitative indicators, such as the growth in the number of program participants, the launch of new business projects, or the level of investment attracted, should be complemented by qualitative characteristics, such as the development of entrepreneurial competencies, including leadership, creativity, and digital communication skills.

Despite the growing attention to digital ecosystems, there is currently a lack of standardized assessment systems that comprehensively reflect the specifics of virtual business hubs. Most existing methods are focused on classical educational programs or traditional business incubators, which does not take into account the flexibility and multidimensionality of virtual platforms (Olshanska O. V., 2024; Chernukha, I., 2024; Hrytsenchuk, O. O.,2020; Senko, T., 2022; Skakun, I., 2022).

Within the framework of VEHUB4YOU, it is important to develop a methodological framework that will allow systematizing key performance indicators, identifying relevant methods of data collection and analysis, and creating tools to objectively measure the impact of hubs on the development of entrepreneurial skills of their users.

Thus, the study of key indicators and evaluation systems within the VEHUB4YOU project has a dual meaning: on the one hand, it provides practical tools for managing virtual business hubs and improving their efficiency; on the other hand, it forms the scientific basis for further development of innovative approaches to entrepreneurial education and support for startups in the digital environment. This creates the preconditions for the integration of best practices into the European educational and innovation space and contributes to the formation of the competitive entrepreneurial potential of the younger generation.

The development of virtual business hubs within the VEHUB4YOU project is determined not only by their organizational and technological content, but also by their effectiveness in creating new opportunities for entrepreneurs and startup teams. An important task is to identify parameters that allow us to assess both the overall impact of the hub on the development of the entrepreneurial environment and specific changes in the skills and competencies of its participants. This requires the use of a system of Key Performance Indicators (KPIs), which are integral measures of performance. KPIs perform several important functions (Fig. 6.1).

According to the functions shown in Fig. 6.1, the key indicators allow for quantitative measurement of the hub's performance, which is especially important in the digital environment, where most processes take place virtually and do not always have tangible material manifestations. Quantitative data provides objective information about the level of activity of participants, the number of completed projects, the intensity of interaction in networks, and other parameters that reflect the hub's performance.

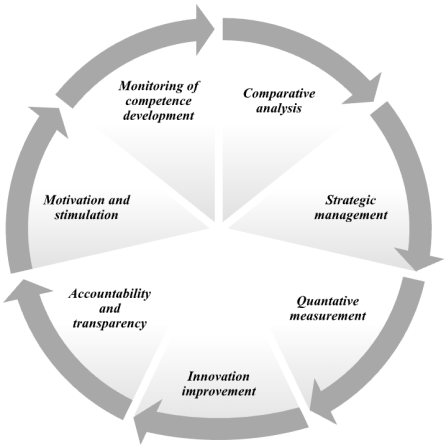

Fig. 6.1. Functions of key indicators for measuring the impact of virtual business hubs on entrepreneurial skills

Source: Author's proposal

This measurement allows not only to evaluate the results achieved but also to identify trends in the development of entrepreneurial skills, which further serves as a basis for management decisions. The use of KPIs allows for comparative analysis both within a single hub over a certain period and between different platforms at the national and international level. Benchmarking helps not only to evaluate the effectiveness of individual initiatives but also to integrate best practices into the internal development and training system, which improves the quality of programs and strengthens the competitiveness of participants. KPIs are also a powerful tool for strategic management, as they provide hub management with accurate and structured information for decision-making. Based on the analysis of KPIs, it is possible to adjust priorities, determine areas of investment in the development of participants, and improve training programs. They allow for the integration of long-term project goals with current processes, ensuring coordination of all hub components and contributing to the achievement of a strategic effect in the formation of entrepreneurial competencies.

KPIs help to track the development of participants' competencies by assessing progress in building key skills such as strategic thinking, risk management, creativity, teamwork, and digital literacy. This makes it possible to identify the individual needs

of each participant and build personalized learning paths and mentoring support. Monitoring the development of competencies helps to improve the efficiency of learning processes, stimulates active participation of participants and ensures a sustainable result in building professional capacity. Key indicators perform an important motivational function, as transparent and clear success criteria encourage participants to actively participate in the hub's programs and initiatives. They create a sense of achievement of specific results, increase participants' self-esteem, and foster a culture of continuous development and self-improvement. The motivational effect of KPIs is manifested not only in the internal incentives of participants, but also in the increased involvement of partners and investors who see the concrete results of the hub's activities.

KPIs ensure accountability and transparency of the hub's activities to all stakeholders - from project management to partners, investors, and participants themselves. Having clear and measurable indicators allows you to demonstrate performance, evaluate the efficiency of resource use, and justify further steps in platform development. Transparency builds trust and shapes a positive image of the hub, which is an important factor in attracting new members and partners. Key indicators also contribute to innovative improvement of the hub's activities. The analysis of the data allows us to identify weaknesses, evaluate the effectiveness of the methods and tools used, find new opportunities for development, and implement more efficient learning and business processes. This approach ensures the continuous improvement of the hub, allows it to respond quickly to changes in the needs of participants and the market, and supports the sustainable development of the business environment.

In the context of VEHUB4YOU, key indicators are of particular importance, as they allow us to assess not only the effectiveness of the project as an educational and innovative initiative, but also its contribution to the formation of a new generation of entrepreneurs capable of operating in the digital economy. For this purpose, it is important not so much to record quantitative results (e.g., the number of startups created) as to track qualitative transformations in the behavior, thinking, and

competencies of participants. It is worth emphasizing that the essence of key indicators in virtual business hubs is multilevel (Fig. 6.2).

Fig. 6.2. Multilevel nature of the essential features of key indicators in virtual business hubs

Source: author's proposal

Institutional level - reflects the ability of the hub as an innovative structure to create an ecosystem of entrepreneurship support. The indicators here are the scale of participant involvement, the number of partner projects, and the level of international cooperation. Educational and competence level - characterizes the development of entrepreneurial skills, creativity, risk management, and teamwork. This is the most difficult level to measure, requiring the use of special techniques and qualitative research. The level of innovation results determines the extent to which activities within the hub lead to the emergence of new business ideas, products, and technologies, and whether they find practical application in the market.

The role of key indicators in VEHUB4YOU is not only to record the results, but also to create a feedback between the participants and the project organizers. On the one hand, participants are able to see their own progress in developing their entrepreneurial skills; on the other hand, organizers are able to adapt training programs, mentoring support, and communication tools to meet identified needs. This approach forms a flexible management system for virtual business hubs that combines individual and collective results.

In today's environment, key indicators are turning into a kind of bridge between educational and innovation activities and the practical results of entrepreneurial activity. They help bridge the gap between theoretical knowledge and real business skills, which is especially important for young entrepreneurs. That's why VEHUB4YOU provides not only for the definition of a system of indicators, but also for their constant updating in line with changes in the market environment, technological trends, and educational practices.

Thus, the key indicators play a dual role: they serve as a tool for objective assessment of the effectiveness of virtual business hubs and act as a catalyst for the development of participants' entrepreneurial skills. Within the framework of VEHUB4YOU, it is the integration of quantitative and qualitative indicators that makes it possible to comprehensively evaluate the project's results and formulate practical recommendations for its scaling.

Measuring the impact of virtual business hubs on the development of entrepreneurial skills requires the use of specialized evaluation systems that can integrate quantitative and qualitative indicators. Within the VEHUB4YOU project, this task is of particular relevance, as the ability to objectively determine the results and effectiveness of the educational and mentoring practices implemented depends on the correctness of the chosen methods. Traditionally, different methods of calculation are used to measure the results of educational programs and innovative initiatives. Among them, the most common are (Fig. 6.3).

A system of key performance indicators (KPIs) allows for a quantitative assessment of the results achieved. In the context of entrepreneurial skills development, KPIs can include indicators such as the number of business models developed, the level of participation in training and incubation programs, and the share of participants who have launched their own businesses after participating in the hub. The Balanced Scorecard (BSC) measures results not only in terms of financial achievements, but also in other key aspects: training and development, internal processes, and stakeholder relations.

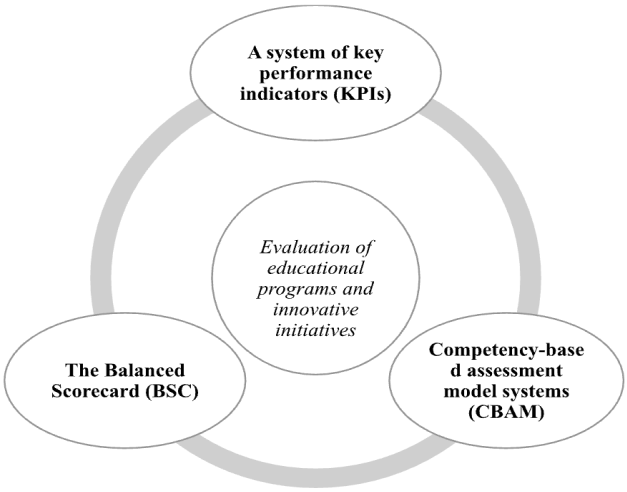

Fig. 6.3. Separate systems of evaluation of educational programs and innovative initiatives

Source: proposed by the author

Within the framework of VEHUB4YOU, this approach allows us to integrate the assessment of competence development, innovation activity, and the level of international cooperation. Competency-based assessment models focus on determining the level of development of specific entrepreneurial skills. We are talking about the ability to strategic planning, risk management, teamwork, and the use of digital tools in business. Such models are particularly useful for analyzing individual achievements of VEHUB4YOU participants.

Within VEHUB4YOU, evaluation systems are not limited to standard quantitative indicators, but include multi-level measurement mechanisms. The combination of quantitative and qualitative approaches allows for a comprehensive picture. For example, along with the number of business ideas created or successful startups, methods for assessing the personal development of participants are used, including questionnaires, self-assessment, and external expert evaluation.

Of particular importance are dynamic evaluation systems that track changes in participants' competencies in the course of their activities in the virtual hub. This approach allows to record progress at different stages of learning and cooperation,

identify strengths and weaknesses of programs and adjust them to achieve maximum effect.

Modern evaluation systems are increasingly based on the use of digital technologies. In VEHUB4YOU, an important component is the use of online platforms and analytical dashboards that automatically collect data on participants' activity, interaction, engagement, and learning outcomes. This allows for not only final evaluation but also ongoing monitoring in real time.

Within the VEHUB4YOU project, entrepreneurial skills assessment systems perform several key functions (Fig. 6.4).

Fig 6.4. Key functions of the entrepreneurial skills assessment system

Source: Author's proposal

Thus, entrepreneurial skills assessment systems at VEHUB4YOU are of strategic importance. They combine classical management approaches (KPI, BSC, CBAM) with competency models and digital tools, which ensures the complexity and dynamism of the assessment. This makes it possible not only to measure the achievements of participants, but also to formulate effective trajectories for their further development in the field of entrepreneurship.

Evaluating the impact of virtual business hubs on the development of participants' entrepreneurial skills is impossible without developing a system of key performance indicators that allows tracking not only the overall performance results but also the profound transformations that occur with participants in the process of their interaction with the innovation platform. Within the VEHUB4YOU project, such a system plays a strategic role, as it allows not only to quantify successes but also to qualitatively assess the contribution of hubs to the development of competencies that determine the ability of young entrepreneurs to operate in the digital economy. It is important to emphasize that the key indicators in this case serve not only to measure but also to manage development, as they set benchmarks for further improvement of educational, mentoring, and incubation programs.

Among the most important performance indicators are those that reflect the educational and competency-based effect of hubs' activities. These include the development of entrepreneurial thinking, strategic planning, teamwork skills, creativity, and innovation. Such skills are measured through specially developed competency matrices, self-assessment tests, expert interviews, and analysis of the dynamics of individual results of participants. Thus, qualitative indicators that reflect personal development complement quantitative data, creating a comprehensive picture of the hub's performance.

Equally important are the indicators related to the innovative results of virtual business hubs. This includes the number of business ideas that have passed the validation stage, the number of startups that have received funding or attracted partners, and the scale of commercialization of innovative products and technologies. At VEHUB4YOU, such indicators allow us to track the extent to which educational and

mentoring activities and the virtual environment created are actually transformed into practical results. It is important that the evaluation is carried out not only by the number of new projects, but also by the quality of innovative solutions, their ability to integrate into the market and find their niche in the international business space.

Special attention should be paid to communication and integration indicators that determine the level of inclusion of participants in the international business ecosystem. These include the intensity of intercultural interaction, the number of partnerships created, the level of participation in joint projects, and the degree of integration into European educational and innovation programs. Within VEHUB4YOU, these indicators are extremely important, as they demonstrate how the hub is becoming a platform not only for local development but also for transnational cooperation. The virtual format opens up opportunities for overcoming geographical barriers, and therefore these indicators reflect the strategic value of hubs as centers for international knowledge and experience exchange.

Financial and organizational indicators also remain important components of the evaluation system. They cover the amount of investment attracted by participants, the amount of resources made available through the platform, and the level of financial sustainability and long-term viability of the hubs. In VEHUB4YOU, such parameters allow us to assess the effectiveness of resource management and determine how sustainable the virtual business hubs' model can be after the project funding is completed.

Thus, the key performance indicators of virtual business hubs within VEHUB4YOU form a multidimensional system that combines educational, innovative, communication, and financial aspects of activity. Their integrated application allows us to objectively assess the impact of hubs on the development of participants' entrepreneurial skills, track progress at both the individual and institutional levels, and formulate strategic guidelines for the further development of similar initiatives on an international scale. Based on the above, we summarize the system for assessing the development of entrepreneurial skills within the VEHUB4YOU project in Table 6.1.

Table 6.1. Assessment system for the development of entrepreneurial skills within the VEHUB4YOU project

Category of indicators	Characteristics	Measurement tools
Educational and competency-based	Reflect the development of entrepreneurial thinking, strategic planning, teamwork, creativity, and innovation	Competency matrices, self-assessment tests, expert interviews, analysis of the dynamics of results
Innovative	Characterizes the number and quality of business ideas, startups that have been validated, received funding, or commercialized innovations	Analysis of the number of validations, startups, attracted investments, and the level of product commercialization
Communication and integration	Reflects the level of international cooperation, intensity of intercultural interaction, creation of partnerships, integration into educational and innovation programs	Monitoring of partnerships, participation in international projects, analysis of inclusion in European programs
Financial and organizational	Evaluate the amount of investment attracted, availability of resources, financial sustainability, and long-term viability of hubs	Financial reports, resource analytics, indicators of sustainability and management efficiency
Strategic	Combine classical management approaches (KPI, BSC, CBAM) with competency models and digital tools for comprehensive assessment	Analysis of KPIs, BSC, CBAM, digital performance monitoring platforms

Source: author's own work

Despite the significant potential of virtual business hubs in developing entrepreneurial skills, the process of evaluating them faces a number of challenges and limitations that need to be taken into account in the VEHUB4YOU project. One of the main challenges is the multidimensionality of entrepreneurial competencies, which include both cognitive and behavioral, communication, and emotional components. Measuring such complex skills often requires a combination of several approaches, which makes it difficult to create a single scorecard.

Another significant challenge is the subjectivity of the assessment. Much of the data in VEHUB4YOU is based on participants' self-assessments, questionnaires, or interviews, which are subject to personal perception and bias. Participants can either

underestimate or exaggerate their own results, which affects the accuracy of the overall picture. The solution to this problem may be to combine self-assessment with independent external expert analysis and automated statistical data collection. A significant challenge in the assessment is the dynamism of entrepreneurial skills, which are rapidly changing under the influence of digital technologies, labor market transformations, and socioeconomic challenges. This means that the assessment system should remain flexible and adaptive, and indicators should be regularly updated. The use of static indicators can lead to a loss of relevance of the assessment and a decrease in its practical value.

Limited resources and time are also an important challenge for VEHUB4YOU. Careful measurement of skills development requires long-term observations, the involvement of qualified experts, and the use of sophisticated analytical tools. In an international project, this creates an additional burden on organizers and can lead to uneven data collection among different groups of participants.

Cultural and contextual differences between VEHUB4YOU participants should be noted separately. After all, entrepreneurial skills are shaped by national traditions, educational approaches, and the business environment. A single set of indicators may reflect the level of competence development in different countries or regions in different ways, which requires adapting the assessment system to local specifics.

Despite these limitations, they can be overcome by implementing an integrated approach that combines quantitative and qualitative methods, using digital monitoring tools, constantly updating indicators, and engaging a wide range of experts. This will create a flexible and reliable evaluation system capable of providing high analytical value for the organizers, partners, and participants of VEHUB4YOU.

The experience of foreign countries in the development of virtual and physical business hubs allows us to form valuable benchmarks for evaluating the effectiveness of such platforms within the VEHUB4YOU project. In Europe, North America, and Asia, evaluation systems that combine quantitative indicators of hubs' activities with qualitative indicators of participants' competencies are actively used. For example, in the UK and Germany, a balanced scorecard is used, which includes an assessment of

innovation results, the level of interaction between participants, the number of startups created, and the financial impact of hubs. Such data allows not only to evaluate the results achieved but also to optimize training programs and mentoring support, adjusting them to the needs of specific groups of entrepreneurs.

In the United States, special attention is paid to analyzing the development of entrepreneurial competencies. Not only the number of ideas implemented is monitored, but also changes in strategic thinking, risk management, teamwork, and digital literacy of participants. For this purpose, competency models are widely used, combined with systems of self-assessment, mentor evaluation, and independent expert analysis. This approach allows creating detailed profiles of each participant's development and assessing progress over time, which is especially important for virtual platforms where activities take place remotely.

Asian countries, such as Singapore and South Korea, are focusing on the digitalization of assessment and analytical tools. They use online platforms, automated panels to collect information on the activity of participants, the intensity of their interaction, the number of projects implemented, and the amount of resources involved. This approach allows us to quickly identify effective practices and problematic aspects of the hubs' work, which ensures quick adjustments to educational and business programs. Asian experience shows that digital tools significantly increase the accuracy and efficiency of evaluation, especially in large and international projects.

It is worth noting that all foreign practices use a combination of quantitative and qualitative methods. Quantitative indicators include the number of participants, startups created, the amount of investment raised, participation in partnership programs, and financial performance. Qualitative indicators include the development of entrepreneurial skills, participant satisfaction, and the effectiveness of mentoring support and communications in hub communities. Such integration allows for a comprehensive assessment of effectiveness and takes into account various aspects of the impact of business hubs on participants and the ecosystem as a whole.

International experience shows that the key success factors of evaluation systems are flexibility, adaptability, and the use of modern digital technologies. It demonstrates

that an effective evaluation of the impact of business hubs is only possible with a comprehensive approach that takes into account the dynamism of skills development, local market characteristics, and the specifics of the target audience. For VEHUB4YOU, these practices become a guideline that allows us to adapt data collection and analysis methods to international standards, provide a comparative analysis of results, and increase the strategic value of the project.

Thus, international experience in evaluating business hubs demonstrates the need to combine quantitative and qualitative indicators, use digital technologies, and regularly update evaluation methods. In VEHUB4YOU, the integration of these approaches allows not only to determine the effectiveness of hubs in developing entrepreneurial skills, but also to create practical recommendations for improving educational and innovation programs in a global context.

Based on the analysis of existing key indicators, evaluation systems, and international experience, a number of practical recommendations can be formulated for the VEHUB4YOU project aimed at increasing the effectiveness of virtual business hubs in developing participants' entrepreneurial skills. The first and most important thing is to integrate quantitative and qualitative indicators into a single evaluation system that allows for a holistic picture of the hub's performance. Quantitative data recording activity, project completion, and resource mobilization should be complemented by in-depth competency assessments, participant self-assessment, and expert observations. This approach strikes a balance between the objectivity of the results and the depth of understanding of entrepreneurial skills development.

It is important to use dynamic and adaptive assessment methods that allow tracking the progress of participants throughout the entire period of participation in the hub. The creation of individual development trajectories, regular monitoring measurements, and digital dashboards for data collection ensure the flexibility of the system and the efficiency of decision-making. An important component of this process is feedback to participants, which motivates them to further develop and allows them to adapt training and mentoring programs to individual needs.

The next practical recommendation for the VEHUB4YOU project evaluation system concerns the integration of international practices and benchmarking, which allows comparing the results of VEHUB4YOU with similar initiatives in different countries. The use of international experience helps to identify optimal development strategies, avoid common mistakes, and implement the most effective training and mentoring methods. It is especially important to take into account cultural and contextual differences to ensure the relevance of evaluation indicators for participants from different regions and increase the adaptability of hubs.

It is important to deepen the digitalization of data collection and analysis. The use of online platforms, analytical dashboards, and big data processing algorithms allows for real-time monitoring, prompt identification of effective practices and weaknesses in the program. This not only improves the accuracy of the assessment, but also enables rapid implementation of changes in educational and innovation processes.

Thus, a comprehensive, multidimensional approach to assessing the impact of business hubs is critical to the effective operation of VEHUB4YOU. Such an approach involves a combination of quantitative and qualitative methods, dynamic evaluation, the use of digital tools, and consideration of international experience. The implementation of these recommendations allows not only to determine the effectiveness of the platform in developing entrepreneurial skills, but also to formulate strategic guidelines for its improvement and scaling, increasing the project's significance in the global context of innovation development. Given the above, VEHUB4YOU has the opportunity to create a sustainable evaluation system that ensures transparency, objectivity, and practical value of the results, promotes the development of the entrepreneurial potential of participants, and increases the effectiveness of interaction between all stakeholders. Implementation of these recommendations will help strengthen the role of virtual business hubs as platforms that can not only educate but also form competitive innovators in the digital economy.

6.2. Feedback from participants in Ukraine, Azerbaijan, and other regions

Monitoring of local requirements, initial needs and expectations of participants (students and facilitators) in the creation of an international network of virtual youth business hubs was carried out on the basis of an online survey in Google-forms, the participants of which were 360 teachers and 2294 students from different countries. The survey was conducted on the basis of questionnaires developed by project participants during February-May 2023.

The survey results are presented below.

6.2.1. Monitoring of local requirements, needs and expectations of facilitators in the creation of an international network of virtual youth business hubs

361 respondents took part in monitoring the needs and interests of facilitators in the creation of an international network of virtual youth business hubs: school teachers and teachers of higher education institutions and colleges from Ukraine and Azerbaijan. The geographical distribution of participants is: 211 respondents (58%) from Azerbaijan and, accordingly, 150 (42%) facilitators from Ukraine.

According to the results of the survey, which was preceded by educational work among the facilitators regarding the goals and expected results of the project implementation, as well as the development of a certified program for improving the skills of facilitators, 80.3% of the respondents expressed a desire to take part in the Erasmus+ international project for free and become a certified facilitator/trainer of the virtual youth business hub, and 19.7% did not express such a desire (Fig. 6.5).

86.1% of respondents from different countries express a desire to supplement the programs available in their educational institutions with new European practices of virtual learning in the field of business education, while 13.9% of respondents did not express such a desire (Fig. 6.6).

Копировать

2. Would you like to participate in the Erasmus+ project as a facilitator?

2. Чи маєте Ви бажання взяти безкоштовну участь у міжнародному проєкті Еразмус+ та стати сертифікованим фасилітатором/тренером віртуального молодіжного бізнес-хабу (міжнародний сертифікат про підвищення кваліфікації за проєктом ERASMUS-EDU-2021-VIRT-EXCH в обсязі 180 годин, 6 кредитів)?

2. Erasmus+ beynəlxalq layihəsində pulsuz iştirak etmək və virtual gənclər biznes mərkəzinin sertifikatlı fasilitatoru/təlimçisi (ERASMUS-EDU-2021-VIRT-EXCH layihəsi çərçivəsində beynəlxalq peşəkar inkişaf sertifikatı) olmaq istərdinizmi? (180 saat, 6 kredit)?

361 ответ

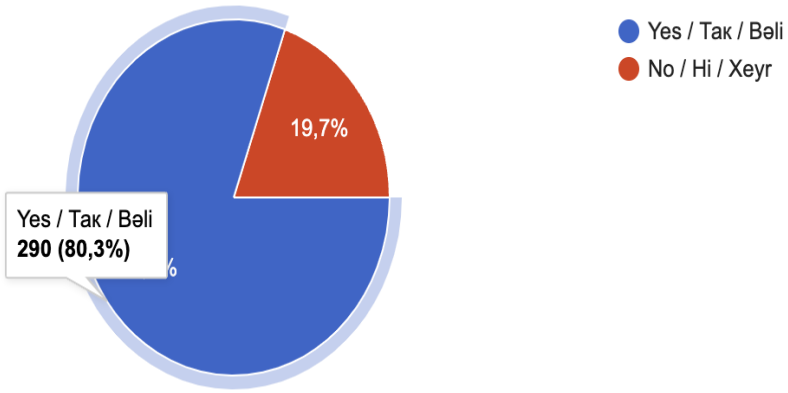

Fig. 6.5. Willingness of the participants to participate in the Erasmus+ international project and become a certified facilitator/trainer of the virtual youth business hub (international certificate of professional development under the ERASMUS-EDU-2021-VIRT-EXCH project in the amount of 180 hours, 6 credits)

The needs of teachers-potential facilitators in international business education are diverse. According to the survey, the majority of respondents, 237 people (65.7%) have a desire to acquire new business knowledge and skills; 222 people (61.5%) - improve qualifications; 217 people (60.1%) - to improve the level of knowledge of a foreign language.

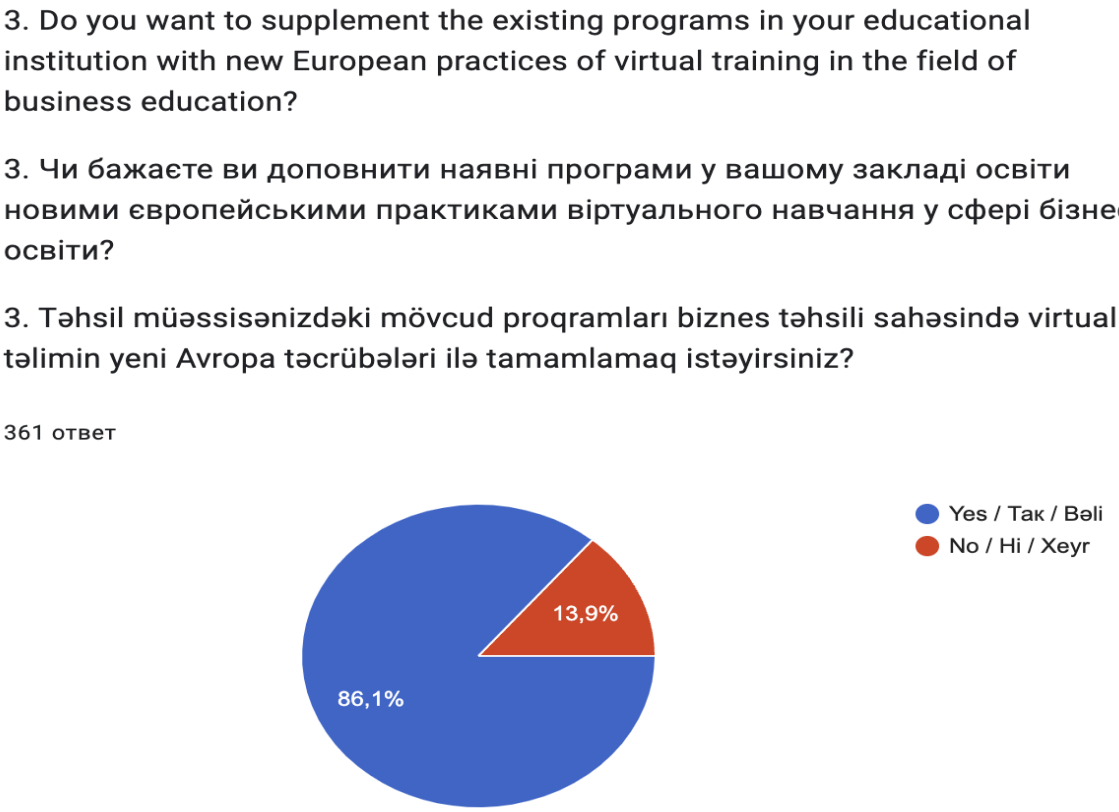

Fig. 6.6. The desire of the participants to supplement the programs available in their educational institutions with new European practices of virtual training in the field of business education

191 people (52.9%) of participants expressed interest in creating an international partnership; 129 (35.7%) - in participation in international mobility. The needs of facilitators in international business education are presented in fig. 6.7.

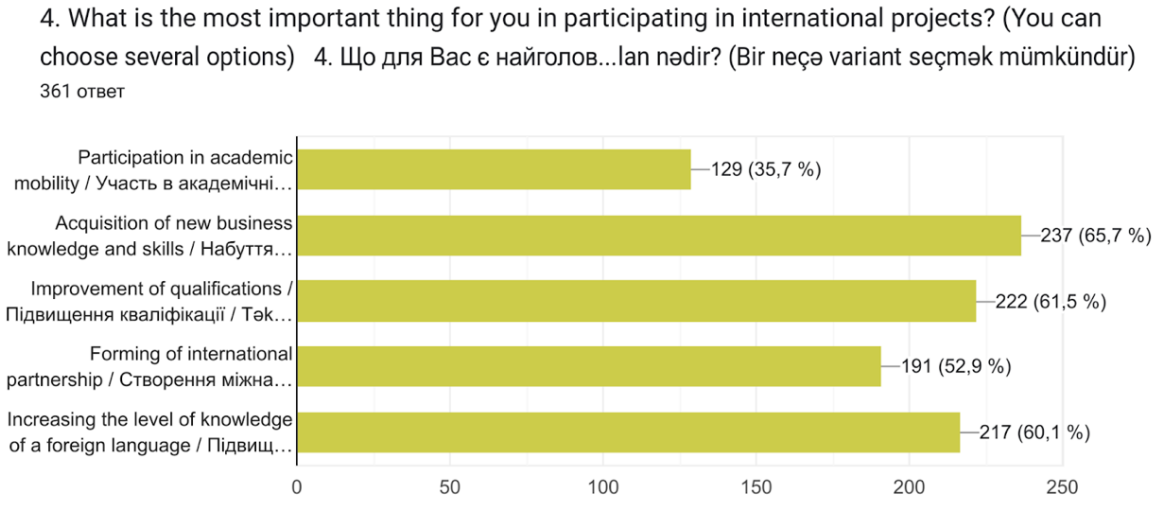

Fig. 6.7. The needs of facilitators in international business education

In addition to professional knowledge and skills, survey participants intend to improve the level of communication skills and soft-skills, in particular, the level of foreign language proficiency (64.0%), intercultural communication (48.8%), intercultural communication skills (48.6%), communication with foreign colleagues based on virtual mobility (9.4%), communication through international business hubs (3.9%). Facilitators' needs for the development of communication skills and soft-skills based on participation in international virtual business hubs shown in fig. 6.8.

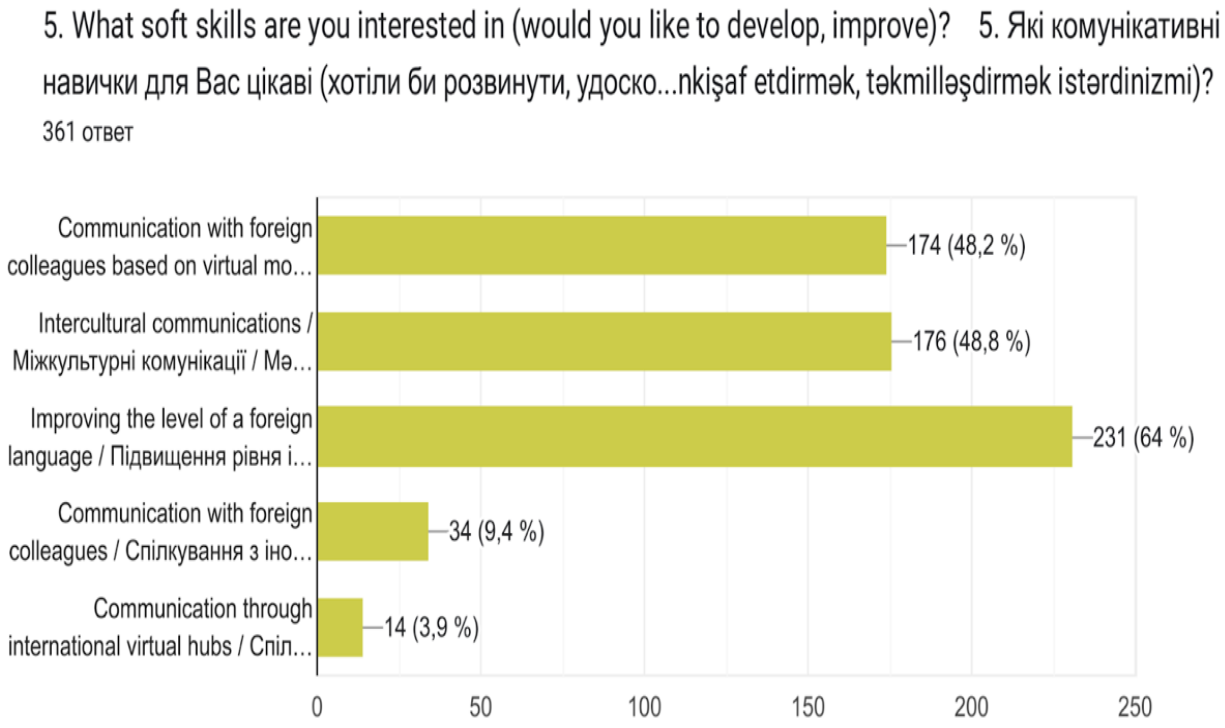

Fig. 6.8. Facilitators' needs for the development of communication skills and soft-skills based on participation in international virtual business hubs.

Participants see participation in international virtual mobility programs in different ways. The majority of respondents (88.3%) prefer to participate in international trainings; 43.9% - participation in international round tables; 23.6% - participation in international debates; 20.8% - in the Olympics; 19.4% - case competitions. Forms of respondents' participation in virtual mobility programs are presented in fig. 6.9.

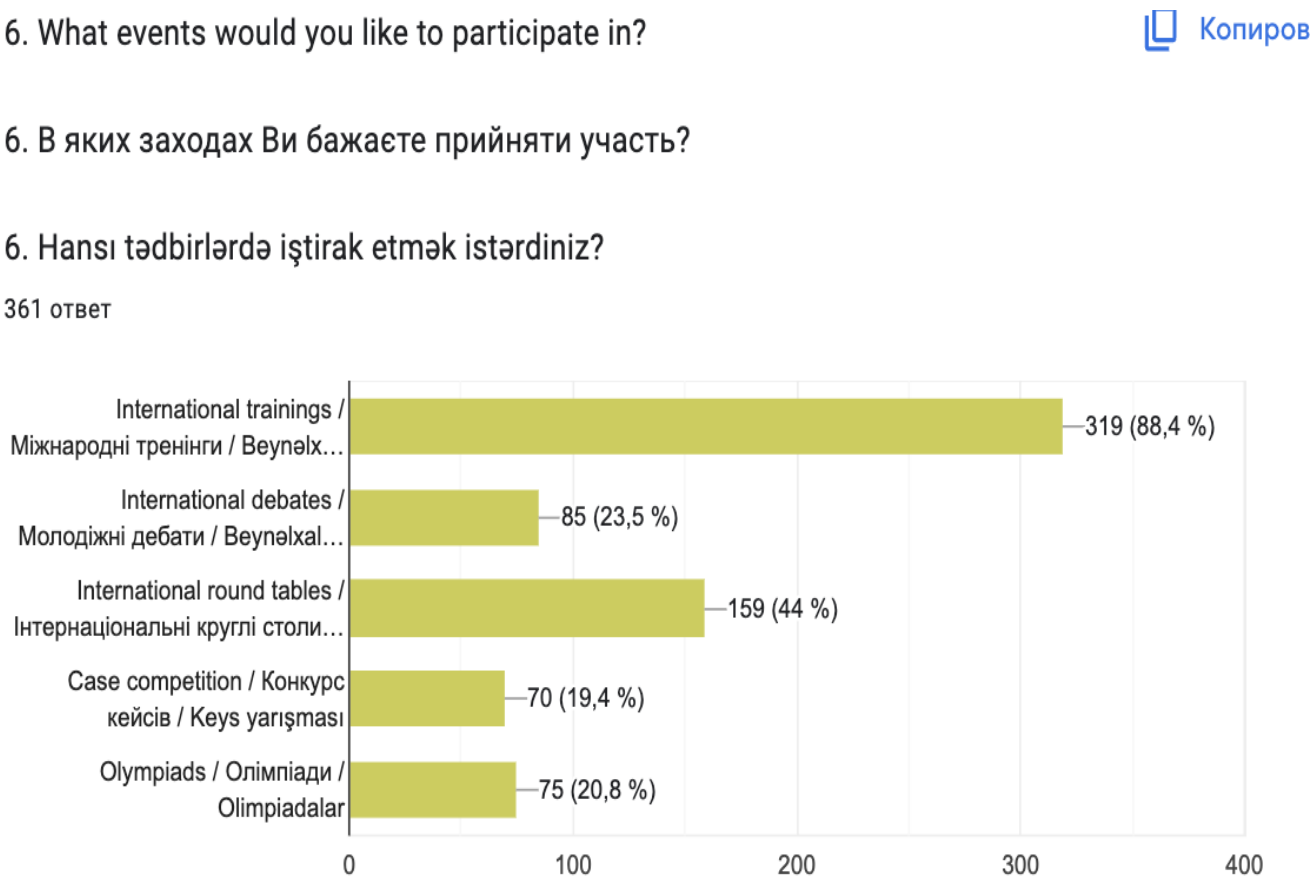

Fig. 6.9. Forms of respondents' participation in virtual mobility programs

Interesting are the results of the survey of facilitators regarding the courses that are most useful for students, which facilitators can offer for international virtual mobility programs and which they wish to learn through participation in the Facilitator Training Program (Fig. 6.10).

According to the results of the study, the most popular courses for facilitators are: basic financial literacy - 58.2%, organization of own business - 45.7%; digitalization - 41.0%, business communications - 41.0%; business design and startup management - 36.8%; economy for business - 35.7%; digital platforms for business - 34.9%, digital communication tools - 31.9%; creating a virtual store - 31.9%; social networks for business - 31.6%; project management - 32.7%, management - 30.5%.

There is a significant need for facilitators in courses related to marketing: online marketing - 33.2%; offline marketing - 15.2%; principles of marketing -26.6%, 3D visualization for virtual marketing - 24.1%, social networks for business - 31.6%.

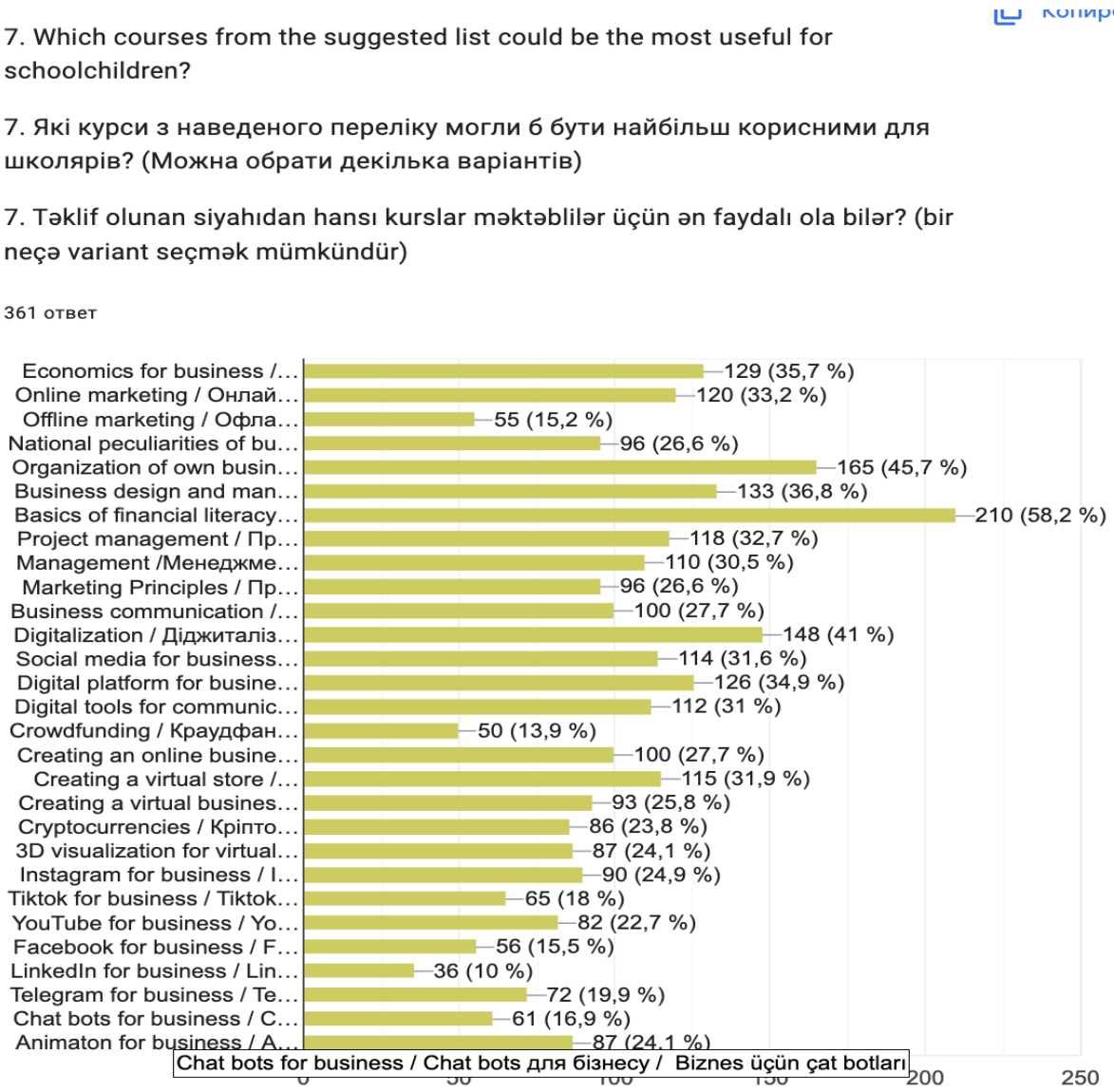

Fig. 6.10. Courses of international virtual mobility programs, most interesting to the facilitator

In the educational process, teachers of universities and colleges, school teachers use various educational platforms that allow to increase the efficiency of the educational process, including in the online format. The use of digital platforms by teachers for virtual learning and exchange is presented in fig. 6.11.

According to the survey data, the most popular digital platform for virtual learning and sharing is Google Classroom (91.1% of respondents use it); the MOODLE platform is also popular (31.0%); the HUMAN platform is used by 10.0% of teachers; Prosvita - 5.0%; MURAL - 3.3%. We have similar results regarding the use of digital educational platforms by teachers in the educational process of their educational institutions (Fig. 6.12).

8. What digital platforms for virtual learning and sharing do you know and use?

8. Які цифрові платформи для віртуального навчання та обміну ви знаєте та використовуєте?

8. Virtual öyrənmə və mübadilə üçün hansı rəqəmsal platformaları bilirsiniz və istifadə edirsiniz?

361 ответ

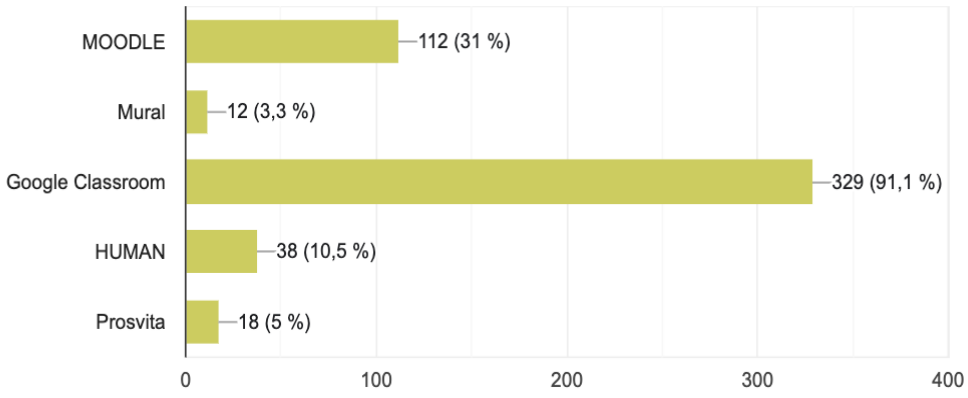

Fig. 6.11. Use of digital platforms by teachers for virtual learning and sharing

9. What digital platforms for virtual learning and sharing do you use in your institution? 9. Які цифрові платформи для віртуального навчання та о...ı rəqəmsal platformalardan istifadə edirsiniz?

361 ответ

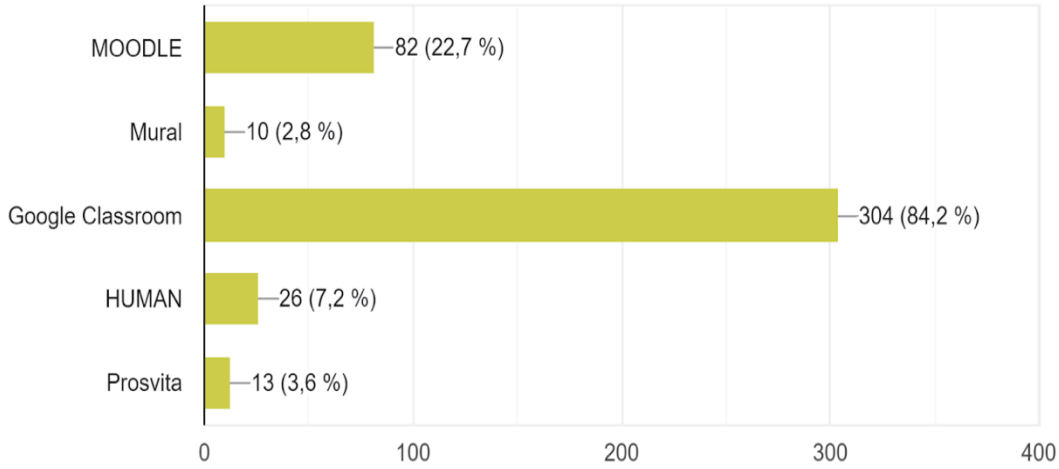

Fig. 6.12. Use of digital platforms by teachers for virtual learning and exchange in educational institutions

According to the survey data, the most popular digital platform used to organize the educational process in educational institutions is: Google Classroom (84.2%); MOODLE - 22.7%; HUMAN - 7.2%; Prosvita - 3.6%; MURAL - 2.8% of respondents.

Digital platforms that facilitators would like to master as part of the training program for facilitators are presented in Fig. 6.13.

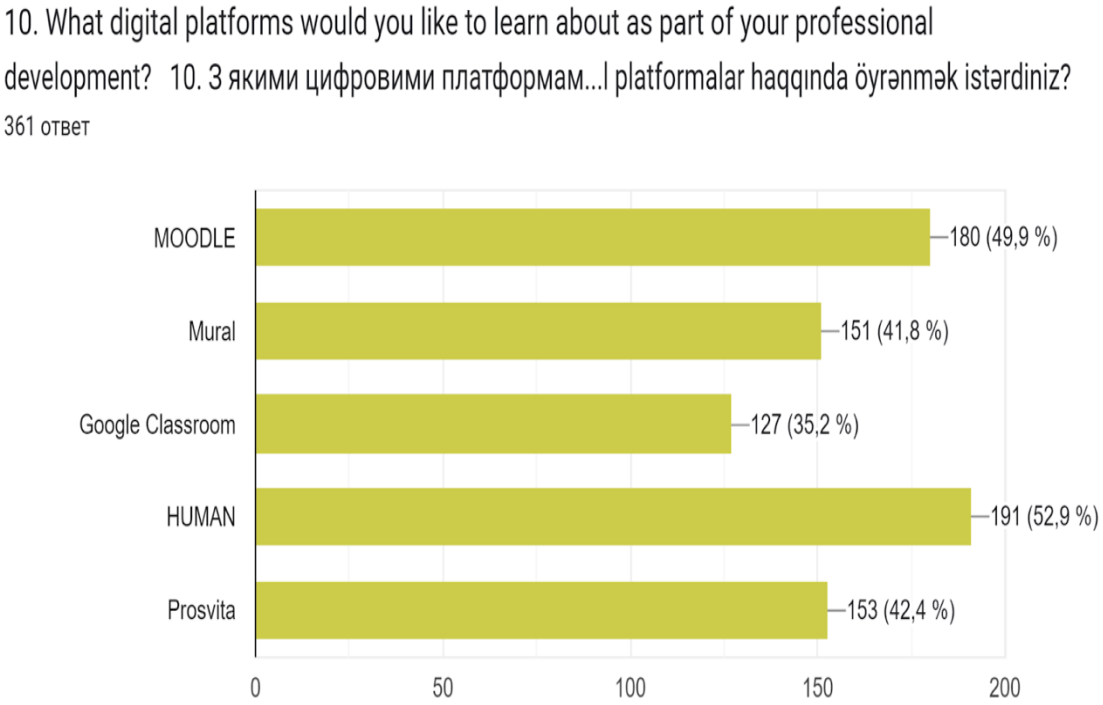

Fig. 6.13. Digital platforms that facilitators would like to master as part of the training program for facilitators

According to the survey, despite the fact that the vast majority of teachers use digital platforms for virtual learning and sharing, they expressed an interest in learning other digital platforms as part of an in-service training program for facilitators. In particular, respondents expressed a desire to master such platforms as: HUMAN - 52.9%, MOODLE - 49.9%, Prosvita - 42.4%; MURAL - 41.8%, Google Classroom (35.2%). Digital applications used by teachers for virtual exchange and learning are presented in Fig. 6.14.

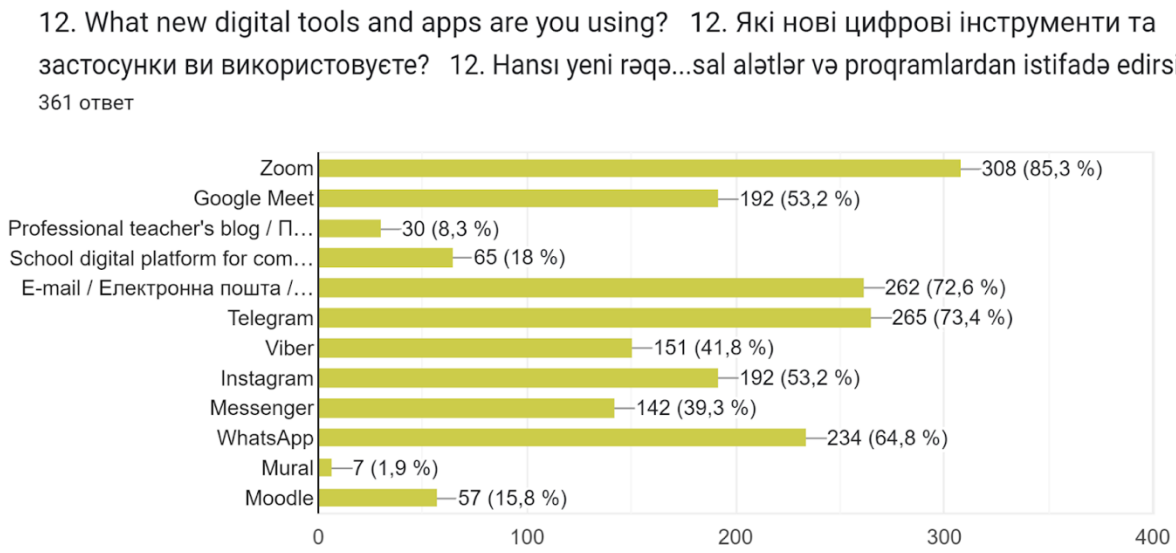

Fig. 6.14. Digital applications used by teachers

The most popular digital applications used by teachers for virtual exchange and learning are: Zoom - 85.3%; E-mail - 72.6%, Telegram - 73.4%, WhatsApp - 64.8%, Instagram - 85.3%, 53.2%. Respondents' answers regarding the format of passing the Professional Development Program were distributed approximately equally: 52.1% want to participate in the program in an asynchronous format, and 47.9% - in a synchronous format (Fig. 6.15).

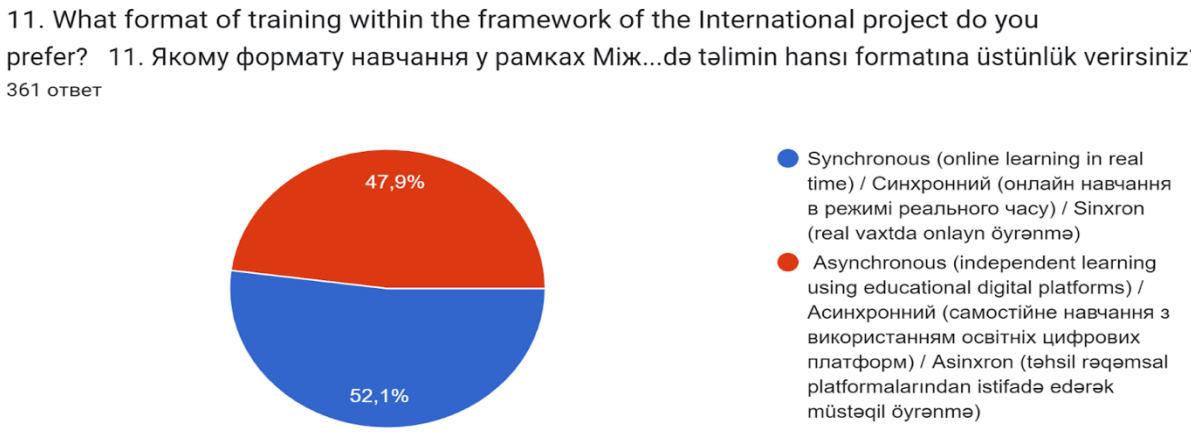

Fig. 6.15. The preferred format of participation of teachers in the Program of professional development for facilitators

Teachers who have expressed interest in participating in the Program of Advanced Training for Facilitators should submit their suggestions regarding the name of their own youth business hubs in educational institutions. These proposals include: Good business, MyLife, IELTS with me(name), Youth excellence, Reverse Delta, Az-teacher, MSU activists, Me in business, Self-development, Like a flower, Service styles, Personal Development Center, Business manager, Virtual meeting, Shine, Development ++, Lucky future, Development center for young children, Modern management, Development, Virtual training, FLOWER, Free step, Create your own business in Europe, Sustainable Business Center, Xmind, CTC (close teachers club), In the magic of the virtual, Integration into the future, Teacher's digital business, My personal business, Universe, CHANCE,School of the future, The future is behind a smart business, Saints, Business - youth, Future, Incubation, Phoenix, youth business hub of gymnasium 16, Let's do it, Startup opportunities, Patriotic Business Hub, City of free people, I WANT! CAN! I WILL!, Young people choose European standards, Innovative entrepreneurship, Creative, The future of Ukraine, Forward to the future, Forward to the future, Initiative, Young people choose the future, Let's Start, Steps to a dream, Prestige, Osvita-Business Hub, Smart and Creative, Solomian cats, Hollahub, School 64, Per aspera ad astra, Anti-crisis communications, Be modern, Young and talented, Theory of life, Digital children, 64home, Ukrainians, Business interests, Ukraine is capable!, Millenium, Youngbiz, Business for grinding, European Ukraine - European opportunities, EasyStart, Interesting platforms for communication economy, YOUNESS (YOUth + busiNESS), Financial literacy, Steps to a startup, Millennium, Business school, Youth experience, Without any obstacles, Business for young people, Youth space, Business education, Business laboratory of the future, Prospect, HAB-FUBD, Information growth, Business generation, Beam, How do you want it, MDU_Tech, Shine, Boos, Youth&business, The potential, World design, The horizon, Elevation, Towards development, Go to the stars!, Faith in the future, Word business, Fitness hall, Tourism Business Centre, Free learning zone, Virtual world, Modern business school, A.Z, Fast step to great success, Awareness Trumpet, Only forward,

Future-Future, The first step to business, Business reality, Human labor assessment business, International business center, Good luck, International learning center, Professionals, Utopia, OnShop, Business center, Development, Business Management, Project HUB, Aster, New Life, Bright future, MRF CENTER, The bright future of young people.

According to the results of the survey, it can be concluded that the majority of the surveyed teachers (86.1%) are interested in participating in the international youth virtual mobility program as certified facilitators / trainers of the virtual youth business hub with the receipt of an international certificate of professional development under the ERASMUS-EDU-2021-VIRT project in the amount of 180 hours, 6 credits.

Teachers are interested in both formats of international mobility: synchronous and asynchronous.

The courses of international virtual mobility programs are most in demand among teachers: basic financial literacy, organization of one's own business; digitalization, business communications; business design and startup management; economics for business, digital platforms for business, digital communication tools; creation of a virtual store; social networks for business; project management, management.

6.2.2. Monitoring of local requirements, needs and expectations of students in the creation of an international network of virtual youth business hubs

2,294 respondents took part in the survey of students' needs and interests in the creation of an international network of virtual youth business hubs: school students, university and college students. from Ukraine and Azerbaijan.

The geographical distribution of respondents is: 1406 respondents (61.3%) from Azerbaijan and, accordingly, 888 (38.7%) respondents from Ukraine. The age structure of the respondents is shown in fig. 6.16.

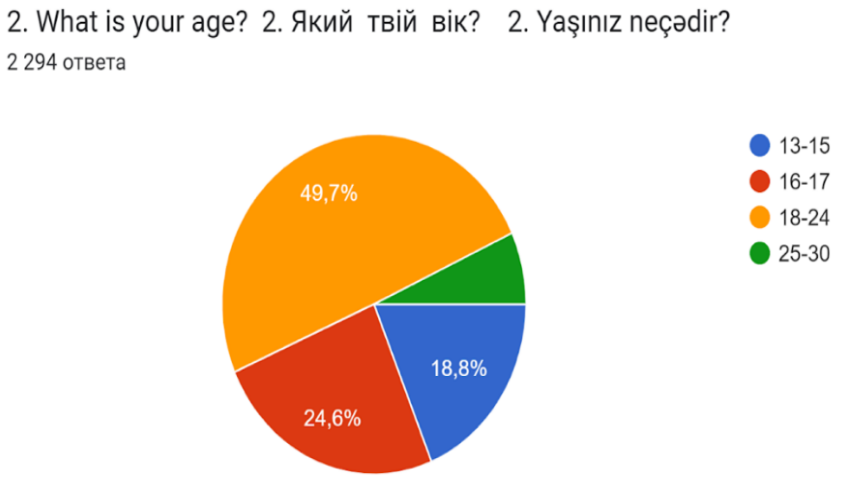

Fig. 6.16. Age structure of respondents

The majority of survey participants (49.7%) are aged 18-24; 18.8% - 13-15 years old, 24.6% - 16-17 years old; 6.9% - 25-30 years old.

The vast majority of students (89.9%) want to become business owners in the future (Fig. 6.17).

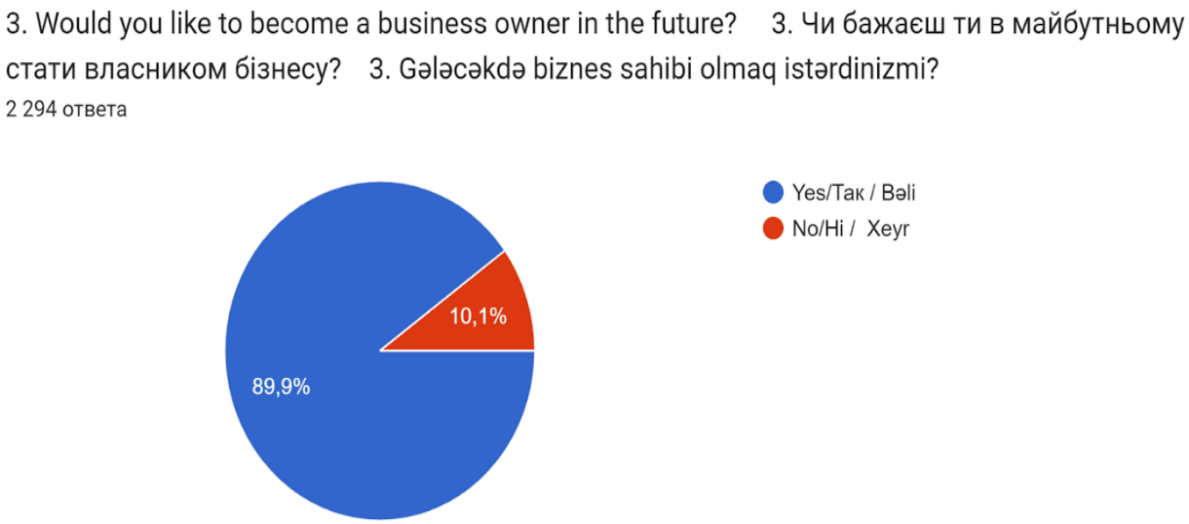

Fig. 6.17. Aspiration of students to create their own business

During the survey, it was found that the majority of students (57.7%) intend to improve the level of foreign language proficiency through participation in international mobility programs (Fig. 6.18).

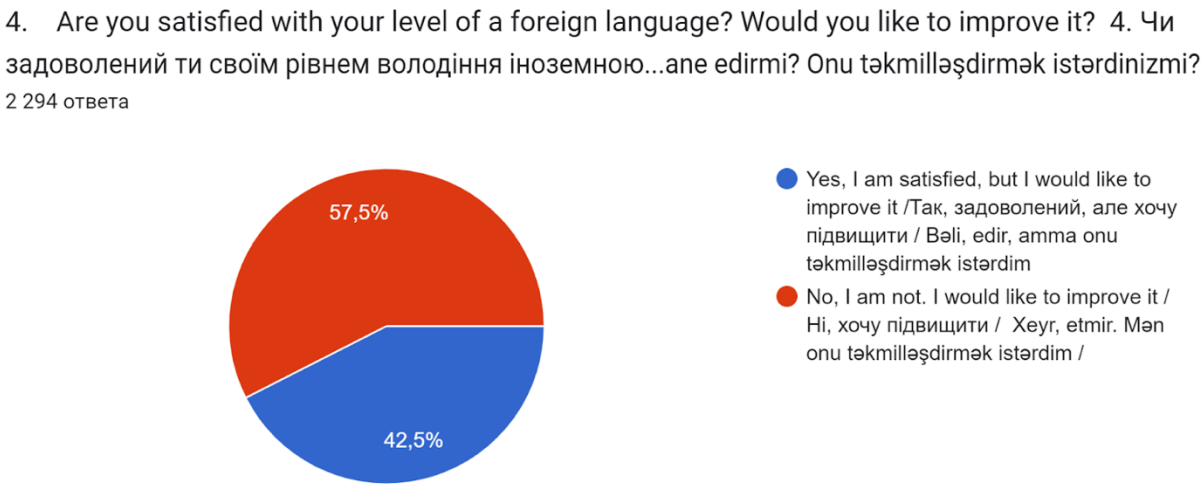

Fig. 6.18. Students' desire to improve their foreign language skills through participation in international mobility programs

According to the survey, most students want to participate in international virtual mobility programs in a hybrid format: 39.7% - in a mixed format, 28.4% - online, 32% - offline (Fig. 6.19).

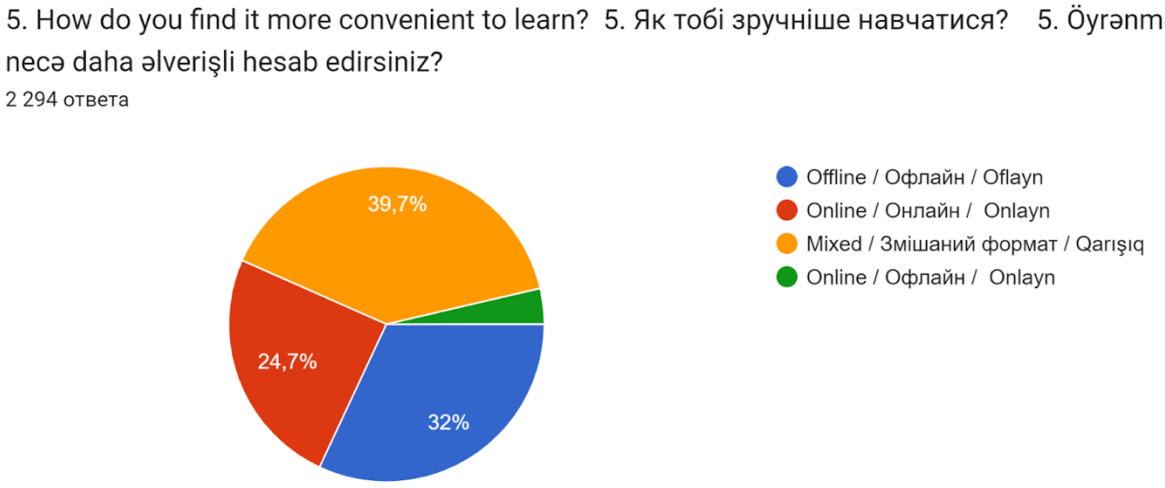

Fig. 6.19. Preferred format of student participation in international virtual mobility programs

Thanks to participation in international virtual mobility programs, students want to develop and improve various communication skills: 70.3% of respondents want to improve their knowledge of a foreign language; 30.9% of respondents want to

communicate with foreign peers; 21.6% - to communicate through international virtual hubs (Fig. 6.20).

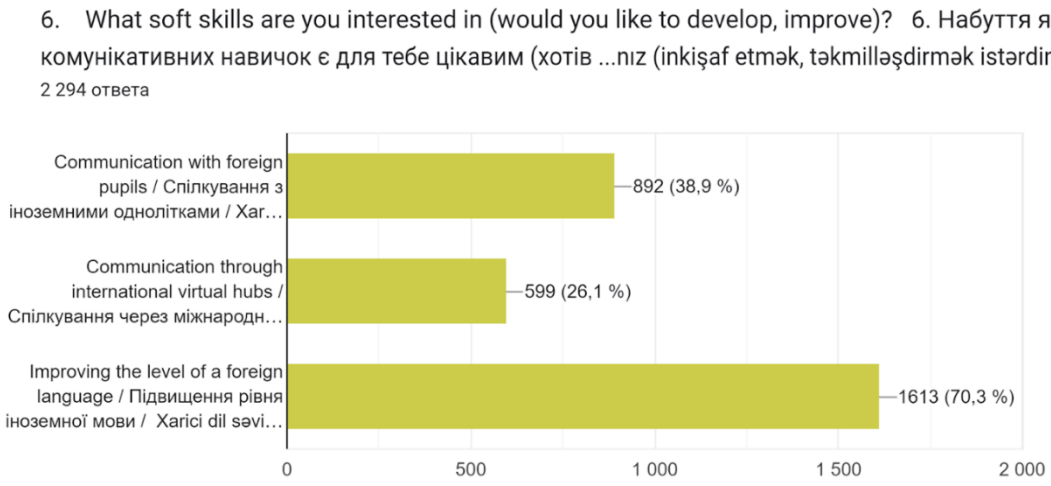

Fig. 6.20. Directions of development of communication skills of students in international virtual mobility programs

Among the business competencies that survey participants would like to develop, 5.4% wish to develop business competencies; 55.2% - skills of creating own business; 23.2% - skills in creating startups (Fig. 6.21).

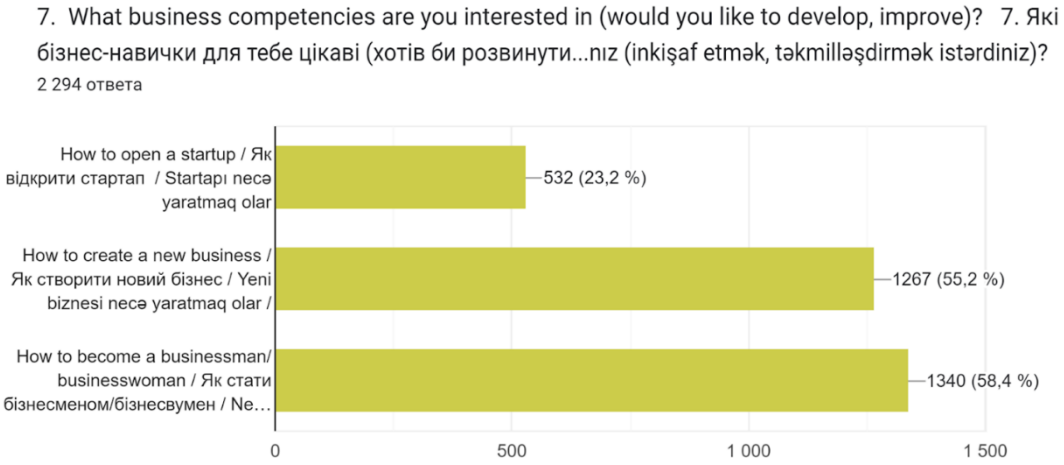

Fig. 6.21. Directions of development of students' business competencies in international virtual mobility programs

According to respondents, the formats of conducting virtual mobility events should be diverse. 50.1% want to participate in international summer schools, 43.5% - in international training; 40.9% - in practical classes; 25.5% - lectures; other

participants also chose to participate in Olympiads, case competitions, international round tables (Fig. 6.22).

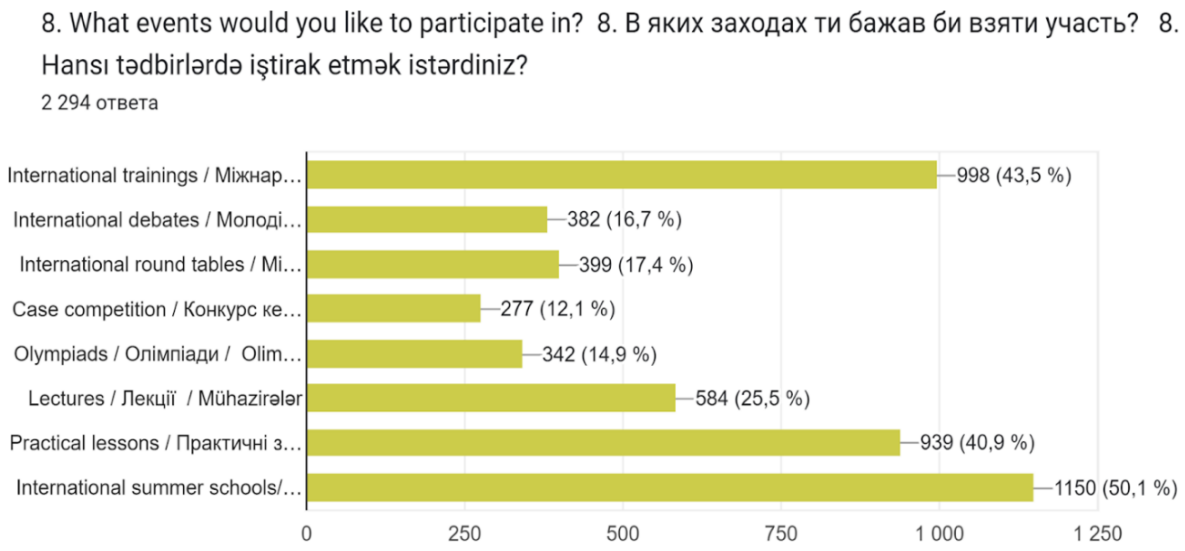

Fig. 6.22. Measures of international virtual mobility programs

The results of a survey of students regarding the courses they wanted to learn in international virtual mobility programs are interesting. According to the results of the research, the most popular courses for students are:

organization of own business 42.9%; economy for business - 37.0%; basic financial literacy - 33.7%, online marketing - 32%; social networks for business - 27.9%; management - 27.7%; creation of an online business (marketplace) - 25.2%; project management - 23.2%; business communications - 21.7%; business design and startup management - 25.2%; offline marketing - 19.2%;

courses aimed at developing students' digital skills: digital platforms for business - 22.5%, digital communication tools - 14.9%; digitization - 19.6%; 3D visualization for virtual marketing - 18.0%;

courses related to social networks and the possibility of using their functions for business: social networks for business - 27.9%; Instagram for business - 28.5%; Tiktok for business - 23.1%; YouTube for business - 23.5%; Facebook for business - 15.5%; LinkedIn for business - 7.6%; Telegram for business - 17.8%; Chat bots for business - 16.6%; Animation for business - 10.9%.

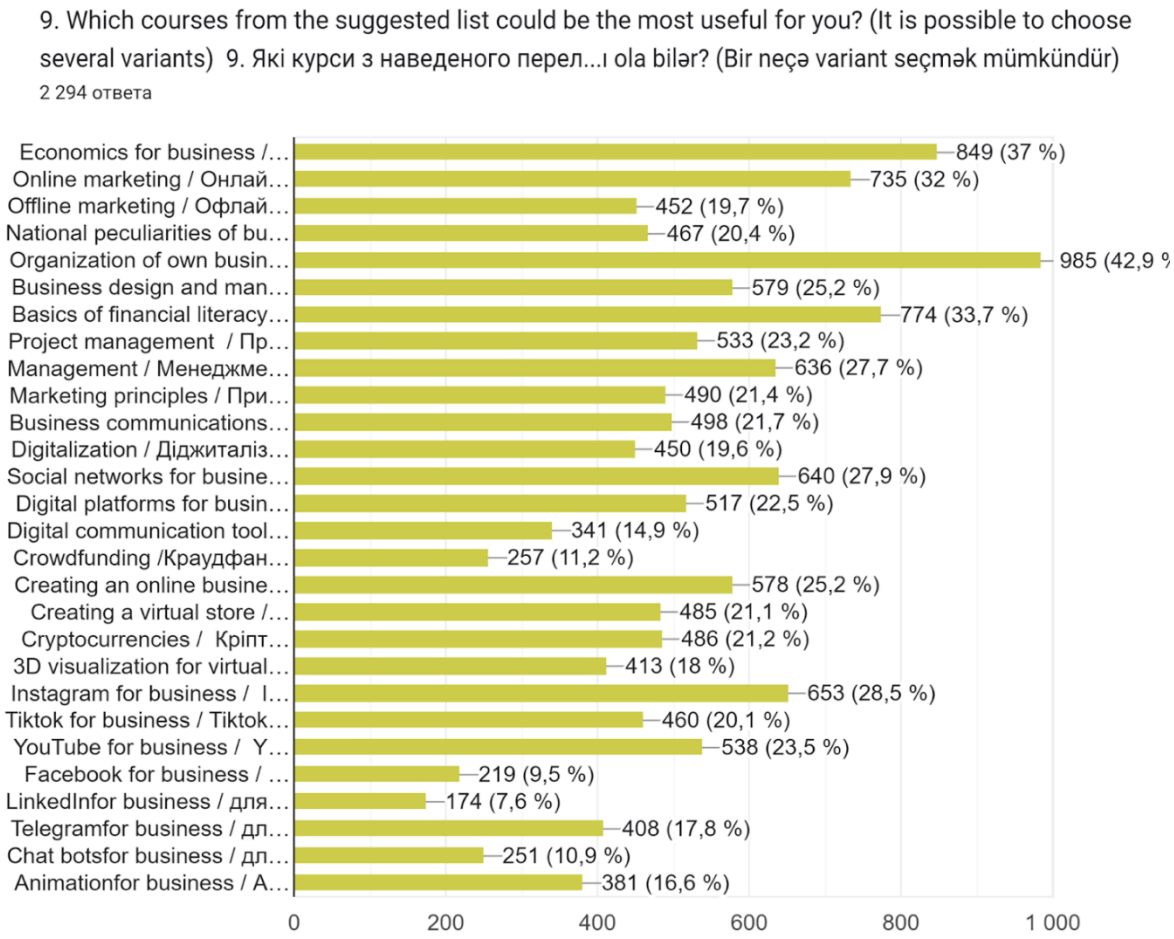

Fig. 6.23. Demand for international virtual mobility courses among students

Digital applications used by students for virtual exchange and learning are presented in Fig. 6.24.

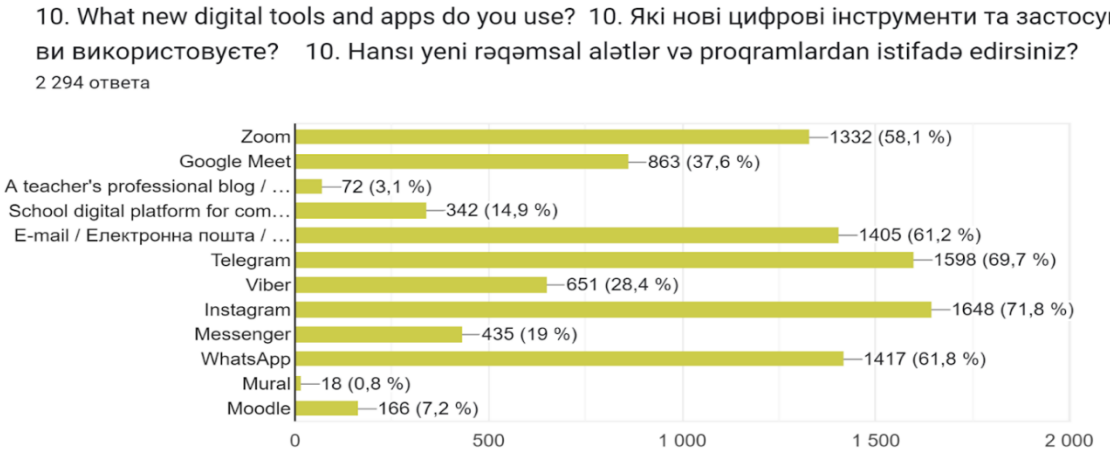

Fig. 6.24. Digital applications used by students for virtual exchange and learning

The most popular digital applications used by students for virtual exchange and learning are: Instagram - 71.8%, Telegram - 69.7%; E-mail - 61.2%; Zoom - 58.1%; WhatsApp - 61.8%; Google Meet - 37.6%; Viber - 28.4%. Messenger - 18.0%.

According to the survey, students use the MOODLE and Google Meet platforms reluctantly: 7.2% and 37.6%, respectively, and hardly use Mural, A teacher's professional blog.

The majority of surveyed students (79.1%) have a desire to participate in joint lessons with their peers from other countries online and wish to receive a Certificate (90%) about international studies within the framework of a European project (Fig. 6.25-6.26).

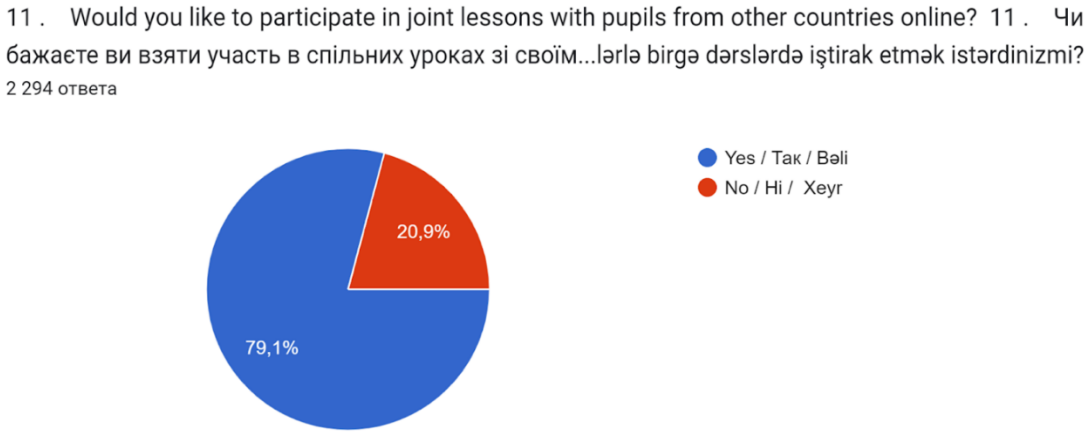

Fig. 6.25. The desire of students to participate in joint lessons with their peers from other countries online

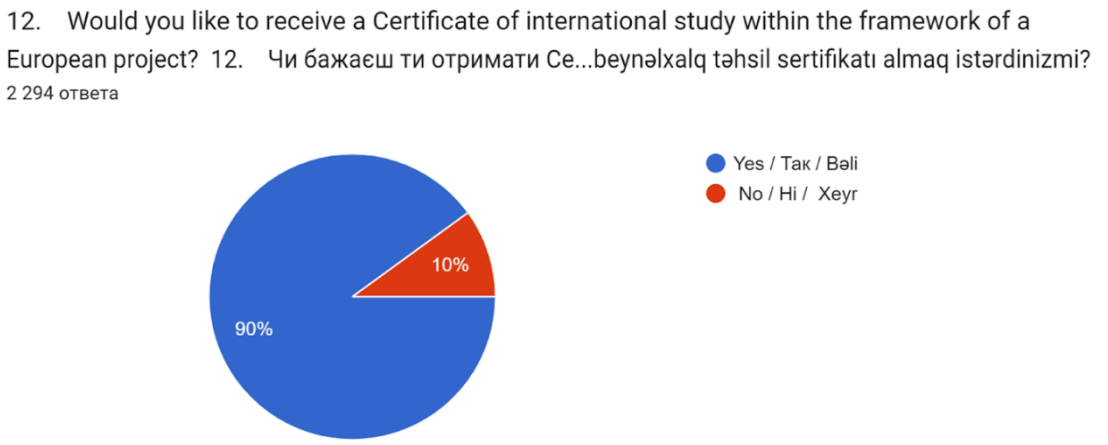

Fig. 6.26. Intentions of students to participate in joint lessons with their peers from other countries online

Students who have expressed interest in participating in international virtual exchange programs should submit their proposals for the name of their own youth business hubs: Center for young businessmen, Youth business center, Educated youth center, Business education, The road to success, The result of endurance and will, Vision of the future, Towards development with young people, Helpful, Vision of the future, Light to the future, Business development center, Forward together, Bright road to the future,Career Center, Young businessmen, Business center, Business among young people, Grand, Good luck, Successful Business, Youth business center, Sacrifice, Youth hostel, A confident future,Young will come, Teenagers, Youth hub, Youth & creativity, Business and design, Economy and creativity, Eagles, Quest, Insect, Youngbae, Unification of people's, Modern economy.

According to the results of the survey, it can be concluded that the majority of surveyed students (89.9%) want to become owners of their own business in the future, and therefore are interested in participating in the international youth virtual mobility program. Students are interested in all formats of international mobility: synchronous and asynchronous.

By participating in the international youth virtual mobility program, students wish to develop and improve their communication skills: level of foreign language proficiency; communication with foreign peers; communication through international virtual hubs. Students also wish to develop business competencies; skills of creating your own business; skills in creating and implementing startups.

The most popular international virtual mobility courses for students are:

- organization of one's own business, economics for business, basic financial literacy, online marketing, social networks for business, management, creation of an online business (marketplace), project management, business communications, business design and startup management, offline marketing;

- courses aimed at developing students' digital skills: digital platforms for business, digital communication tools, digitization, 3D visualization for virtual marketing.

The results of the conducted survey of facilitators and students regarding their wishes and expectations from the international virtual mobility program make it possible to draw the following conclusions:

- most of the respondents are interested in participating in the international virtual mobility program;
- survey participants are ready to participate in the international virtual mobility program in synchronous and asynchronous formats;
- facilitators and students need to develop communication skills and business competencies based on participation in the international youth virtual mobility program;
- the courses most in demand among facilitators are: basic financial literacy, organization of one's own business; digitalization, business communications; business design and startup management; economics for business, project management, management, digital platforms for business, digital communication tools; social networks for business;
- the most popular among students are the courses of the international youth virtual mobility program: organization of one's own business, economics for business, basic financial literacy, business communications; online marketing, offline marketing, social networks for business, management, project management, business design and startup management.

6.3. Long-term educational impact

Considering its main characteristics, the concept of education can be defined as follows: as a part of socio-economic life, education is a system of knowledge, skills, and habits of national and universal significance, which is purposefully, systematically, and organizedly taught in a specific period at an educational institution, offering

opportunities for upbringing and psychological development. It serves as both a necessary condition for learning in one instance and as an outcome in another.

Education is a fundamental factor for the development of every society and for the lives of individuals. In the modern era, the importance of education is not only about acquiring knowledge and skills, but also about being a significant factor that determines the long-term economic, social, and cultural development of individuals and societies. Education plays a fundamental role in improving the quality of life for every individual, creating new opportunities, and contributing to the overall development of society. For individuals, education ensures better job opportunities, higher income levels, and healthier lifestyles in the future, while for societies, it brings about crucial impacts in economic development, restoring social justice, and preserving cultural values.

Education is not limited to the knowledge and skills learned in school and university; it is a process that deeply and permanently impacts an individual's life. Understanding the long-term impact of education is extremely important in recognizing its true power and the wide-ranging, lasting benefits it brings to society and individuals. Education shapes not only the academic aspects of a person's life but also their thinking, feeling, and behavior throughout their entire life.

It is necessary to carefully evaluate the long-term effects of education, which extend throughout an individual’s entire life and influence all stages of their development. The short-term effects of education can be measured by the knowledge and skills students acquire within a certain period, but long-term effects demonstrate how education shapes a person’s entire life and provides continuous development.

Understanding the long-term impact of education goes beyond the knowledge gained in the classroom. It requires comprehensively recognizing the impacts of education on an individual's personal development, social and economic conditions, psychological well-being, and the overall development of society. Education not only provides theoretical knowledge but also fosters individuals' problem-solving skills, creativity, critical thinking abilities, empathy, and social skills. Furthermore, these

developments help individuals manage their personal lives better and achieve success in social environments.

6.1.1. Personal Development and Social Knowledge: Education plays a significant role in the development of individuals' personalities, the formation of their worldviews, and the establishment of social relationships. Education not only equips individuals with practical skills but also instills ethical values, human rights, social justice, empathy, and collective responsibility. These aspects of education contribute to individuals becoming more transparent, thoughtful, and inclined to collaborate. This, in turn, brings long-term benefits to both personal and public life.

6.1.2. Economic and Professional Development: Education provides individuals with the necessary knowledge and skills for better job opportunities and professional growth. When entering the labor market, educated individuals are more likely to secure higher salaries and occupy higher positions. Additionally, educated individuals make greater contributions to their families, communities, and countries. The achievements gained in professional life also influence other areas of personal life, such as social status, quality of life, and self-confidence.

6.1.3. Societal Development and Social Equality: The impact of education on society is observed in a broader and deeper sense. The level of education in society contributes to increased social equality and accelerates economic development. Educated individuals tend to find better jobs, become more socially active, and participate in solving various societal problems. This emphasizes the importance of proper government policies in the field of education. Ensuring that education is equitable and accessible to all is a fundamental tool for promoting social justice and eliminating inequalities within society.

6.1.4. Health and Longevity: The long-term impact of education on health is also significant. Research shows that individuals with higher levels of education tend to lead healthier lifestyles, are more knowledgeable about health issues, and address health problems more promptly. This contributes to increased longevity. Education helps individuals acquire accurate information about health, adopt healthy lifestyle habits, and maintain better psychological well-being.

6.1.5. Challenges and Inequalities in Access to Education: However, there are several challenges in accessing education. Factors such as income, ethnic background, and gender determine individuals' accessibility to quality education. In particular, low-income and ethnic minority groups face significant barriers to education access. This deepens inequalities and restricts social mobility. The effects of illiteracy not only affect individuals but also have a negative impact on entire communities. Uneducated individuals face higher unemployment and poverty rates, which harms the overall well-being of society. Education systems should work to eliminate these inequalities. To achieve this, it is crucial to strengthen educational infrastructure and implement socially inclusive policies.

Education significantly influences not only individuals' intellectual and cognitive development but also their quality of life, economic situation, social position, and health. Each of these areas that impact an individual’s life helps us understand the long-term effects of education, which are felt across economic, social, cultural, and health domains. In this section, the long-term impacts of education on individuals will be analyzed in greater depth across these various sectors.

6.2.1. Economic Impacts

The economic impacts of education are of significant importance for both individuals and society. The contributions of education to the economic sector are manifested in increasing employment opportunities, raising income levels, and accelerating overall economic development.

Since the 1990s, the opening of the economies of developing countries to international markets, the application of new information and communication technologies, and the development of biotechnology have led to profound changes in the structure and characteristics of global economic development. These changes have also led to significant shifts in the organization of production and the workforce, in response to the new challenges faced by the global economy. The emerging new production processes and innovative organizational forms have significantly altered the quality and quantity of the labor resources demanded by enterprises. Thus, these revolutionary changes have deepened the connection between economic development

and education, underscoring the importance of the literature that examines this relationship. This close link between education and development emerges as one of the main driving forces of economic growth. The impact of education on economic processes is significant in two key areas.

The first point is that the accumulation of human capital enhances production efficiency. Increasing human capital not only boosts labor productivity but also creates conditions for higher returns on other factors of production. Possessing human capital also facilitates the generation and dissemination of new ideas, which, in turn, promotes technological development and ultimately ensures overall income growth. This process naturally encourages enterprises to invest in human capital, as a highly educated and skilled workforce enables more productive and innovative outcomes.

The second point concerns the broad-scale impact of the education system on society. Education generates significant external effects, not only in the production sector but also in overall social development. The education and training system not only provides individuals with better positions in the labor market but also enhances their quality of life, thereby fostering their social and cultural development. Education creates new opportunities in every sector of society, supporting the rise of the most capable and qualified individuals to management and leadership positions in the economy and other fields. This is a crucial factor in promoting societal development.

The role of education also becomes more relevant in accelerating the transition to a knowledge-based economy, particularly in a period marked by educational deficiencies and difficulties in accessing the labor market. As societies increasingly recognize the importance of education in economic development, attention and demand for this sector have grown. To meet the demands of such a period, it is essential to overcome the existing challenges in the education system and create equal conditions for access to the labor market. This situation requires a fundamental transformation for both individual development and the overall economy.

The Relationship Between Education and the Labor Market, and Its Impact on Income Levels:

In the labor market, education is one of the key factors that determine individuals' income levels. Individuals with higher levels of education generally receive higher wages. This is due to education providing individuals with deeper and more specific knowledge, making them more skilled and specialized. Education creates better job opportunities, and access to positions requiring experts and high professional skills becomes a prerequisite.

Conversely, individuals with lower education levels tend to work for lower wages and in sectors that do not offer high job security. Therefore, education plays a crucial role in increasing income and improving economic conditions. Research shows that obtaining an education helps reduce income disparities over the long term and promotes economic equality.

Increase in Employment Opportunities:

Education enables individuals to access better and broader employment opportunities in the labor market. Educated individuals can apply for more specialized jobs, which typically offer higher wages. The increase in employment levels ensures that educated individuals play a more significant role in the workforce.

Another important impact related to the increase in employment opportunities is the decrease in the unemployment rate as education levels rise. Educated individuals are more adaptable and better prepared to meet the demands of a changing job market, which reduces the risk of unemployment. As a result, education accelerates the economic development of society and improves individuals' living standards.

6.2.2. Social and Cultural Impacts

Education plays a vital role in the development of society and the well-being of individuals. This influence is not limited to the economic sphere; it also has profound effects in social, cultural, and health areas. The impacts of education are broad and multifaceted, as it shapes individuals' lives not only in material terms but also socially, culturally, and psychologically. Education helps change individuals' social positions, improves their quality of life, supports the preservation and development of culture, and enhances their health and overall well-being.

Education is one of the primary tools for social mobility. Social mobility refers to the ability of an individual to move upwards in social and economic strata, gaining better opportunities and advancing. This is particularly significant for individuals from lower social classes, as they can change their social position through education, gaining access to higher-paying professions. Education leads to progress not only in individual development but also in the economic and social structures of society. Therefore, education fosters not only personal development but also the overall social mobilization of society.

Furthermore, education offers individuals a better quality of life. Educated individuals tend to lead healthier lives, not only in material terms but also socially and emotionally. They are better able to maintain their health, adopt healthy lifestyles, exercise regularly, and eat well. Education also helps improve individuals' family lives and social relationships. Educated individuals make better decisions, particularly in their personal and social lives. For example, education teaches individuals their rights, social responsibilities, and decision-making skills, which ultimately contribute to enhancing the welfare of society.

Education also plays a significant role in the preservation and development of culture. One of the most valuable characteristics of every society is its history, traditions, and cultural values. Education is crucial for transmitting these values to future generations. It introduces individuals to the traditions of society, teaching them its values and customs. This helps preserve culture and ensures that future generations will continue to uphold these values.

Furthermore, education fosters a broader understanding of cultural diversity among individuals. As people become more familiar with different cultures, they come to understand their values, develop empathy, and adopt an open-minded perspective. Educated individuals recognize the importance of intercultural relations and contribute more to the coexistence of various cultures. As a result, education not only helps preserve existing cultural values but also creates conditions for the emergence and development of new cultural flows.

6.2.3. Impact on Health and Well-being

Education increases individuals' awareness of health-related matters and teaches them to adopt a healthy lifestyle. Educated people are generally more knowledgeable about proper nutrition, regular physical activity, and overall healthy lifestyles. As a result, education enables individuals to protect themselves from diseases and identify health problems at an early stage. The benefits of education for health are not limited to physical health. Education also improves mental health. For example, managing stress, seeking psychological support, and adopting positive psychological approaches can all be learned through education.

The impact of education on health extends beyond individuals to positively influence society as a whole. Educated individuals live longer, healthier, and more productive lives. They also benefit from better healthcare services and achieve higher levels of social welfare. This leads to improvements not only in individual health but also in the overall health status of society.

Education is a key tool in raising awareness about health. Educated individuals possess more knowledge on health matters and are more likely to apply this knowledge in their lives. Thus, individuals with higher levels of education tend to lead healthier lifestyles. They adopt healthy habits such as proper nutrition, regular exercise, avoiding smoking, and staying away from alcohol. Additionally, educated people are more likely to detect health symptoms earlier, which helps in treating or preventing diseases at their early stages. Research shows a positive correlation between education level and life expectancy, with educated individuals living longer and healthier lives.

Moreover, education improves individuals' mental health. As people's education levels increase, their ability to manage stress also improves. Education helps establish better awareness and support systems regarding psychological health. Educated individuals learn better strategies for managing psychological problems and stress, and they are more open to seeking psychological support. This contributes to improved overall well-being, strengthens mental health, and helps prevent psychological issues such as depression and anxiety.

Education not only relates to health but also enhances the well-being of society. Education enables individuals to better understand their rights, social responsibilities, and contributions to society. This is essential for increasing social welfare, ensuring social equality, and advancing societal development. The impact of education on society results in progress across economic, social, and cultural spheres. It also creates the opportunity for the emergence of more just and sustainable societies. Education, especially by promoting economic and social equality, facilitates development in all areas of society.

Moreover, education also supports technological advancements and innovations. Developments in education stimulate scientific research, the creation of new technologies, and the growth of industries. This accelerates societal development and aids in the establishment of more modern, sustainable economies. Consequently, education forms the foundation of development not only for individuals but also across all sectors of society. Therefore, it is important to study and support the long-term impacts of education on society, as it not only improves the welfare of current generations but also allows for the creation of more just and advanced societies for future generations.

Education enables individuals to benefit more from healthcare services. Educated individuals are better informed about the availability of healthcare services and have quicker and more effective access to them. They are also more knowledgeable about the quality of healthcare services and make more informed treatment decisions. Educated individuals are more likely to have access to health insurance or social services, as they are more aware of these opportunities.

Furthermore, education encourages individuals to ask more questions about healthcare and to choose the treatment methods that best suit their needs. Educated individuals are more likely to make independent health decisions and conduct more research on treatment options. This helps them avoid medical errors and improve the quality of healthcare services.

Education not only has significant impacts on physical and mental health but also on social welfare. Educated individuals are more likely to participate in various social

and economic activities within society. This strengthens their social connections, helps them avoid isolation, and increases their overall well-being. Additionally, education provides individuals with a better understanding of their rights and social responsibilities. They are also more inclined to contribute to society and help others. This positive impact of education on social welfare increases the overall development and stability of society.

Education also promotes social equality. Individuals with higher levels of education tend to rise to higher social and economic positions and enjoy better living conditions. Education also creates equal opportunities for other groups within society, thereby raising the overall welfare level of society. Education, particularly for those facing social and economic difficulties, provides new opportunities and improves the overall welfare of society.

6.3.1. Economic Development

Education plays a crucial role in the economic development of society. The growth of Gross Domestic Product (GDP), economic growth, and development are primarily dependent on the quality and breadth of education. On one hand, education strengthens the workforce by developing the skills required in the labor market, and on the other hand, it enables the development of social and economic infrastructure. Every member of society, through education, can become more productive and innovative, thereby accelerating development across all sectors of the economy.

Impact of Education on the Growth of Gross Domestic Product and Economic Development:

Education has a significant impact on the growth of Gross Domestic Product (GDP). A highly educated workforce is more productive and produces higher-value goods and services. Education also enhances the productive capacity of the workforce and ensures a higher level of specialization and individualization within the economy, thereby strengthening economic growth. Individuals with higher education levels have access to more job opportunities, earn higher wages, and, as a result, contribute more to the economic development of society.

Additionally, an increase in education levels helps reduce unemployment rates and contributes to a more equitable income distribution. Education accelerates long-term economic development in society, ensures social stability, and reduces wealth disparities.

The Growing Role of Technology and Innovation in Economic Development:

Education also fosters the development of technology and innovation. Educated individuals adopt new and advanced technologies, making production processes more efficient and faster. Innovations and technological advancements are crucial for the modern and sustainable development of the economy. Higher education in societies is essential for the implementation of new scientific research, technological discoveries, and industrial innovations.

The impact of education on economic development is significant in the following aspects:

- Creation of Human Capital: Education better prepares individuals for the labor market. Educated workers possess higher skills, which enhance the efficiency of production. An increase in human capital raises the number of workers employed in higher-income and more productive sectors of the economy. As a result, labor productivity rises, leading to GDP growth.

- Innovation and Technological Development: Education lays the essential foundation for the generation and development of innovations. Higher education and scientific research enable the creation of new technologies and products. This is one of the factors that accelerates economic development. Scientific research and technological advancements lead to the creation of new job opportunities and more efficient improvements in outdated work methods.

- Impact of Higher Education on Economic Growth: When a country invests more in its education system, a larger number of people with higher education emerge, and these individuals not only improve their own living standards but also contribute to enhancing the overall economic condition of society. Educated individuals earn

higher wages and incomes, which leads to increased consumption and overall economic activity.

- International Competitiveness and Overall Economic Growth: The quality of education also affects a country's competitiveness in the international market. Education, particularly in developing a highly skilled and experienced workforce, ensures that the economy remains competitive in the global market.

6.3.2. Social Justice and Equality

Education plays an indispensable role in ensuring social justice and creating equal opportunities within society. The expansion of education reduces economic and social inequalities within society, creates fairer opportunities among individuals, and enhances social mobility. Moreover, education is a significant tool in promoting equality and enabling everyone to realize their full potential.

Ensuring Social Justice and Creating Equality through Education:

Education provides equal opportunities, which are the foundation of social justice. Making education accessible to all members of society prevents discrimination between different social strata. Educated individuals have greater social and economic opportunities and integrate better with other members of society. This is especially important for children from underprivileged families, as through education, they can access better job opportunities and achieve higher social positions within society.

Education not only imparts technical skills but also raises awareness of one’s rights, which is particularly vital for individuals in lower social classes. Education empowers individuals to recognize their rights, defend them, and participate actively in society. This contributes to the development of social justice and society as a whole.

The impact of education on social justice is also evident in the fight against poverty. Education provides children from low-income families the opportunity to receive a good education, which in turn ensures better job opportunities in the future. Educated individuals are able to escape poverty and improve their social status.

Social Mobility and Societal Stabilization:

Education increases social mobility and the ability of individuals to move within society. Educated individuals, regardless of their family background, economic status,

or other social factors, have greater opportunities to realize their potential and change their social and economic position. This contributes to societal stability and development. The equal distribution of education across the various strata of society reduces social discontent and inequality, creating a more stable and harmonious society.

6.3.3. Technological Development and Innovation

Education is not only the foundation of the economy but also of scientific, technological, and innovative development. Technology and innovations make various sectors of the economy more productive, flexible, and sustainable, while education fosters advancements in these areas. The education system creates an environment that promotes modern scientific research, technological innovations, and the development of new ideas.

Impact on Scientific Research and Innovation Activities:

Education leads to advancements in scientific research and innovation. Higher education develops individuals' research skills, encouraging them to discover new knowledge and develop technologies. With the support of education, students and scholars work on scientific projects and generate new ideas. This facilitates faster development in scientific research, technological innovations, and the creation of new products. Education not only imparts theoretical knowledge but also provides opportunities for practical experience, creativity, and the search for new solutions.

Technological Development in the Economy and the Increasing Role of Innovation:

The strengthening of the education system accelerates the implementation of new technologies and innovative ideas. This helps achieve progress in new sectors of the economy, optimize product production, and improve manufacturing processes. At the same time, education enables society to identify its needs in the fields of science and technology and provides opportunities to foster new developments in these areas.

In the modern era, education places increasing emphasis on technological innovations and encourages progress in technological fields. This results in better job opportunities, the emergence of new industrial sectors, and the creation of innovative

businesses within society. As a result, education accelerates technological development, ensuring sustainable economic growth.

The quality of education is one of the most important factors in shaping the future of society. High-quality education not only develops individuals' skills but also influences the overall development of society. Managing and forecasting the quality of education is critical for ensuring both individual development and the social and economic advancement of society. Furthermore, education policies and strategic planning play a key role in ensuring the sustainable development of education. This section will discuss the management of education quality, its long-term impacts, and the role of education policy development and strategic planning.

6.4.1. Ensuring the Quality of Education

The quality of education is determined by various parameters: the effectiveness of curricula, the professionalism of teachers, student achievements, the learning environment, and the accessibility of educational resources. Managing the quality of education is not only possible through monitoring and regulating these factors but also by applying advanced methods to improve education in the future.

Methods of Managing and Forecasting the Quality of Education:

There are various ways to manage the quality of education. Among these, three main methods and approaches are commonly used:

1. Additional Metrics and Indicators: Detailed statistical data and indicators are used to monitor the quality of education. These indicators include assessments of students, teachers' performance, school infrastructure, student satisfaction, and other various metrics. Based on this data, it is possible to identify areas where education is weak and take corrective measures for improvement.

2. Teacher Training and Development: Teachers are the most important component of a high-quality education system. The professional development of teachers plays a key role in improving the quality of education. Teachers’ adoption of modern teaching methods, use of technology, and participation in continuous training directly enhance the quality of education for students.

3. Application of Advanced Technologies: Advanced technologies, including online teaching platforms, analytical tools, and the enhancement of educational resources, are crucial in managing the quality of education. For example, electronic assessment systems are highly effective for monitoring and analyzing the quality of education. These technologies can identify weaknesses in the education system, allowing for the necessary adjustments to be made.

Forecasting Methods and their Role in Shaping the Future Development of Education Quality:

Forecasting methods help determine how to shape the future development of education quality. Analyzing the positive and negative trends within the education system enables a better understanding of how education will evolve. Additionally, these forecasts provide recommendations for education policymakers and teachers.

Quality assurance plays a vital role in ensuring that educational institutions maintain high standards and provide students with valuable learning experiences. This encompasses both internal and external processes that monitor, evaluate, and enhance the quality of education. This paper will examine the significance of internal and external quality assurance within educational institutions, their roles, benefits, and methodologies.

Internal Quality Assurance:

Internal quality assurance refers to the processes and mechanisms implemented within educational institutions to monitor and continuously improve the quality of education. The main aspects of internal quality assurance include:

1. Curriculum Design and Development: Educational institutions establish rigorous processes to design and develop curricula that align with educational objectives, industry requirements, and student needs. This involves defining learning outcomes, selecting appropriate teaching methods, and regularly updating and reviewing the curriculum.

2. Teaching and Learning Experiences: Internal quality assurance ensures that teaching and learning experiences are effective, engaging, and aligned with the curriculum. This includes providing professional development opportunities for faculty

members, promoting innovative teaching methods, and creating a supportive learning environment.

3. Assessment and Evaluation: Internal quality assurance includes robust systems for student assessment and evaluation. This encompasses the preparation of reliable and valid assessments, ensuring transparency and fairness in the evaluation process, and providing timely feedback to students to support their learning and development.

4. Student Support Services: Educational institutions offer a wide range of student support services to enhance the overall learning experience. These services may include academic advising, counseling, library resources, and extracurricular activities, all aimed at enhancing student success and well-being.

5. Institutional Research and Data Analysis: Internal quality assurance involves the collection and analysis of institutional data to identify areas for improvement. This includes monitoring student performance, analyzing attendance and graduation rates, and conducting surveys and focus groups to gather feedback from students, faculty, and staff.

External Quality Assurance:

External quality assurance refers to the evaluation and accreditation processes conducted by external agencies to assess the quality and standards of educational institutions. These agencies are typically established by government or professional organizations to ensure that educational institutions meet predefined criteria. The main aspects of external quality assurance are as follows:

1. Accreditation and Certification: External quality assurance agencies evaluate educational institutions based on established standards and criteria. Institutions that meet these standards are granted accreditation or certification, which demonstrates their commitment to providing quality education. Accreditation enhances the reputation of educational institutions, facilitates student mobility, and provides assurance to stakeholders.

2. Peer Review and Evaluation: External quality assurance agencies conduct comprehensive evaluations of educational institutions through the peer review process.

This involves external experts visiting the institution, reviewing documents, conducting interviews, and assessing various aspects such as curriculum, faculty quality, infrastructure, and management.

3. Compliance with Regulatory Requirements: External quality assurance ensures that educational institutions comply with regulatory requirements set by relevant government authorities. This includes adherence to legal and ethical standards, financial transparency, and compliance with relevant policies and regulations.

4. Continuous Improvement: External quality assurance agencies promote continuous improvement in educational institutions by providing feedback, recommendations, and support. Educational institutions are encouraged to address areas for development identified during the evaluation process, which helps enhance the quality and effectiveness of education.

Benefits of Internal and External Quality Assurance:

1. Improvement of Education: Internal and external quality assurance measures ensure that students receive high-quality education that meets their needs and prepares them for future success, thereby improving the overall educational experience.

2. Accountability and Reliability: Quality assurance processes bring accountability and reliability to educational institutions. Accreditation and certification from external agencies demonstrate the institution's commitment to delivering quality education, which builds trust among students, employers, and other stakeholders.

3. Continuous Improvement: Educational institutions can identify areas for improvement by monitoring their practices, and implement changes to enhance the quality of education. External evaluations and recommendations further support this ongoing process of improvement.

4. Recognition and Mobility: Accreditation and certification from recognized external agencies facilitate student mobility and the recognition of qualifications. Students can transfer credits between institutions, and employers can trust diplomas awarded by accredited institutions.

Internal and external quality assurance are critical factors in ensuring high-quality education within educational institutions. By implementing internal quality assurance

processes, institutions can actively monitor and improve the quality of education they provide. External quality assurance, through accreditation and evaluation processes, validates and enhances the credibility of educational institutions while encouraging continuous improvement. Together, these quality assurance measures contribute significantly to the overall success and reputation of educational institutions, as well as to the quality of education students receive.

6.4.2. Education Policies and Strategic Planning

Education policies and strategic planning are crucial tools for ensuring the long-term development of education. Establishing high-quality education systems is not only possible through the effective use of educational resources but also by formulating education policies that align with the socio-economic needs of the country. Education policies generally define the structure, objectives, and direction of the education system, while strategic planning involves the practical application of these policies and the assessment of their long-term impacts.

Development and Implementation of Long-term Education Policies:

Long-term education policies should be developed with consideration of the future needs of society and the economy. These policies are implemented to strengthen the education system, ensure equal opportunities within education, and stimulate social development. Furthermore, addressing inequalities and promoting social inclusivity are vital elements in education policies.

When formulating education policies, demographic structure, economic development trends, scientific research potential, and technological development demands must be taken into account. For instance, in response to the increasing demand for advanced technological knowledge, special attention should be given to STEM (Science, Technology, Engineering, and Mathematics) fields within education policies.

The strategic planning process assists in determining the primary goals in the education sector. For example, education programs can be developed considering the workforce needs of the country. Additionally, the application of modern educational

technologies and the improvement of resources in educational institutions are integral components aimed at enhancing education quality.

To ensure the sustainable development of education, strategic plans should not only respond to current needs but also anticipate future potential demands. Innovations and changes in education are effectively implemented based on these plans.

Key Stages of the Strategic Planning Process:

1. Defining Key Objectives: The strategic planning process helps in identifying key objectives at various stages of education. These objectives are related to preparing education programs in line with workforce needs and improving the quality of education.

2. Application of Modern Educational Technologies in Teaching: Strategic planning also focuses on the implementation of educational technologies. The use of modern educational technologies enhances the quality of education and enables educational institutions to manage their resources more efficiently.

3. Stimulating Social Development: Education policies aim not only to foster scientific and technological development but also to stimulate social development. Education must ensure equal opportunities for every member of society and promote social inclusivity.

Education policies should be developed in alignment with the social and economic development goals of each country. The most important aspect of education policies is the creation of equal opportunities within the education system, the enhancement of social inclusivity, and ensuring that education benefits the entire society. Additionally, education policies should be structured in accordance with the demographic and economic structures of society, scientific research potential, and technological development demands.

When formulating long-term education policies, it is crucial to consider the future of society. These policies should not only respond to current needs but also anticipate future changes. For example, as the development of technological fields and the enhancement of knowledge in these areas are necessary, education policies must focus specifically on STEM (Science, Technology, Engineering, and Mathematics) fields. In

this regard, education policies prepare curricula in line with scientific and technological demands and promote the advancement of these fields.

For sustainable educational development, strategic plans should not only meet current needs but should also be designed to predict future demands. Innovations and changes in education are implemented based on these plans, supporting the development of the education system.

Successful Examples of Education Policies:

1. Finland’s Education System: Strategic planning and quality management in Finland's education system are of a very high standard. Education policies in this country are centered around ensuring that every citizen has equal access to education. Professional development of teachers and the quality of teaching are prioritized. The management of education quality is monitored through various teaching programs and assessments.

2. Singapore: In Singapore, education policies are rigorously developed and continuously updated. The country improves its education system in line with the demands of the economy. Key objectives of the education policies include expanding technological infrastructure, continuously developing teachers, and aligning curricula with modern scientific advancements.

The long-term impact of education plays a significant role in the development of both society and individuals. These impacts are not only evident in economic, social, and cultural spheres but also in personal development, health, and well-being. The profound effects of education on human life are among the key factors that shape both individual and societal development. The quality of education, its sustainability, and its impact on individuals' lives are further strengthened through long-term forecasts and strategic planning. In this regard, the implementation of quality management and appropriate policies at various levels of education positively shapes the future of society.

Summary of Key Points:

1. Impact on Individuals: The impact of education on individuals not only improves their economic situation but also ensures social and cultural mobility. High-

quality education leads to better employment opportunities and higher income levels. At the same time, the impact of education on health and well-being is visibly positive.

2. Impact on Society: Education influences the economic development of society and contributes to the growth of the Gross Domestic Product (GDP). Additionally, the role of education in social justice and equality is a crucial factor in equalizing opportunities among different social classes. Education focused on scientific research and innovation fosters technological advancement and the emergence of new ideas within society.

3. Management of Educational Quality: Managing and forecasting the quality of education ensures the sustainable and effective development of the education system. Teacher development, the use of advanced technologies, and the modernization of educational programs all contribute to enhancing the quality of education.

4. Education Policies and Strategic Planning: The development and sustainability of education are ensured through well-developed education policies and strategic planning. These policies support the development of the education system in accordance with social, economic, and technological demands, while addressing the needs of the modern era.

Importance of the Long-Term Impact of Education and Future Perspectives:

The long-term effects of education not only shape the present but also play a critical role in shaping our future. These impacts accelerate economic development, enhance social equality, improve individuals' quality of life, and boost the overall welfare of society. The long-term benefits of education, both individually and collectively, further elevate its global significance.

In the future, several important developments are expected to enhance the long-term effects of education and contribute to even greater positive impacts:

1. Impact of Technology on Education: The role of technology in education will continue to grow. The implementation of new technologies in educational institutions will improve the quality of teaching and make the educational process more effective.

2. Reduction of Inequalities: Addressing inequalities in education will ensure that every member of society has access to equal opportunities in education, thereby strengthening social justice.

3. International Perspectives on Education: Closer global connections and international cooperation will open new perspectives in education. Educational exchanges will provide opportunities for countries to share experiences and foster mutual development.

In conclusion, the long-term impacts of education leave deep traces in every aspect of society. These effects will help in the creation of strong and sustainable societies in the future. Improving the quality of education and maximizing its long-term impacts will lead to the formation of healthier, more equitable, and developed societies. To achieve this, education policies, strategies, and applied methods will play a pivotal role in shaping the future.

Quality education and training are necessary not only to promote growth and efficiency but also to create a positive cycle that can generate beneficial effects by improving the quality of life for individuals. This, in turn, can positively influence the entire nation and, ultimately, the global economy.

In conclusion, the role of education in the development of both society and individuals is invaluable, and managing these effects effectively is of crucial importance for the well-being of future generations. Strengthening education in all fields, creating equal opportunities, and implementing advanced education policies will significantly contribute to the sustainable and inclusive development of society. These issues define the key directions for the further improvement and development of the education system in the future.

CHAPTER 7

VIRTUAL EXCHANGE FUTURES IN HIGHER EDUCATION - GLOBALIZATION, INSTITUTIONAL TRANSFORMATION, AND NEW STRATEGIES FOR DIGITAL UNIVERSITY BRANDING

7.1. Globalization of the educational space through the development of virtual exchange programs

The challenges facing the higher education system in recent years in terms of increasing the level of adaptability, ensuring digital and green transformations of society, require systemic reforms and unification of approaches to the direct development of higher education, which is implemented through strengthening the means of political cooperation, promoting the integration of education and science, disseminating best practices in collaboration between universities, including by promoting mobility and developing virtual exchange programs.

Mobility in higher education should be considered as the process of obtaining a full-fledged foreign degree or knowledge from individual courses abroad, which generally contributes to the graduate's employment both in their own country and overseas. Student mobility is the enrichment of young people with knowledge and traditions of interculturality obtained in different countries, which is the basis for broadening their horizons and professional skills (Burmann, M., & Delius, A., 2017).

From a professional point of view, mobility is the opportunity to include applicants in networks with high research potential, creating conditions for further cooperation (Education and Training, 2020). As noted in the article (Koti Sh., Lé E., Sijariya F., 2022), the growth rate of student mobility has always roughly matched the growth in youth participation in higher education. Between 2000 and 2015, the demand for international education at least doubled, and by 2025, it will more than double again, reaching over 7 million students (Koti Sh., Lé E., Sijariya F., 2022). There are several countries with a relatively higher share of international students: Canada (29%),

Australia (25%), the United Kingdom (23%), France (13%), Germany (11%), and Denmark (10%) (Eurostat. (n.d.)).

Significant differences are observed between countries and in terms of the share of students studying abroad: Ukraine (6.1%), Kazakhstan (12.2%), Uzbekistan (19.1%), Latvia (6.5%), China (1.9%), India (1.3%), Germany (3.8%), France (3.8%), Bulgaria (11.2%), Austria (5.8%). In 2021, 1.52 million students from abroad obtained higher education in the EU. More than two-fifths (44%) of students from abroad who studied at a higher level in the EU in 2021 were from Europe, 25% from Asia, and 17% from Africa (Our World in Data, 2021).

The development of higher education in the EU countries is taking place through the formation of the European Education Area, which is a platform for interaction in terms of building sustainable education systems and creating conditions for obtaining synergies. For knowledge, research, and innovation to become the basis of Europe's development in the future, integration processes must take place at the level of educational systems.

The main vectors of interaction of educational systems are: ensuring the quality of education and training, inclusion and gender equality, implementing green and digital transformations, emphasis on higher education, and the geopolitical dimension (European Education Area. (n.d.)).

An essential mechanism for forming the European educational space is the development of cooperation between member states, including ensuring student mobility through the implementation of virtual exchange programs. However, the development of virtual exchange programs that takes place in universities in EU countries fully corresponds to global processes. The globalization of the educational space in recent years has spread to educational technologies, among which virtual exchanges occupy an essential place.

Virtual exchanges are educational opportunities for students to obtain modern competencies at universities in different countries, which, through interaction and based on the use of digital technologies, create and offer educational programs based on an inclusive international experience.

Virtual exchanges were introduced as an experiment to deepen knowledge of foreign languages. Over time, especially during the pandemic, the offer of programs has expanded, particularly in digital literacy, leadership, intercultural communication, and others.

Virtual exchanges, through the use of online platforms, have significantly expanded the educational environment and the scale of their impact on the transformation of society.

Currently, a range of virtual exchange models are used, which are classified:

- by the content of the content provided - disciplinary and interdisciplinary;
- by the form of delivery - synchronous and asynchronous in online and offline modes.

Virtual exchange programs are offered by both individual universities and their networks. Among the main networks are the following: COIL Connect, Brazilian Virtual Exchange (BRaVE), Red Latinoamericana COIL, UNICollaboration, SUNY COIL, and the Asia Pacific Virtual Exchange Association (APVEA), JPN-COIL Association in Japan, and others.

For example, The Association of Pacific Rim Universities (APRU) is a network that unites 61 universities in America, Asia, and Australia and offers online courses directly for virtual exchanges (The Association of Pacific Rim Universities (APRU) (n.d.)).

The International Education and Resource Network (IEARN) has been created in the USA, which offers educational programs that go beyond the borders of the state. To date, 2 million students from 140 countries have participated in the network's programs. A significant part of the projects on which participants in the iEARN-USA programs work have concerned measures to improve communities (International Education and Resource Network (iEARN) (n.d.)).

AFS Global offers: programs for teenagers, in particular, programs aimed at developing intercultural communication and understanding the importance of change; programs for adults focused on developing knowledge and skills in accordance with

the requirements of the global market. A separate area of AFS Global's activity is special programs for developing skills in the STEM field (AFS Global. (n.d.)).

The practice of encouraging teachers who offer and use virtual exchanges is becoming more widespread. For example, the Atlanta Center for Global Studies cooperates with the University of Georgia and offers virtual exchanges. Among the main arguments for the spread of virtual exchanges, the Atlanta Center for Global Studies notes that all students have the right to develop professional skills that meet the requirements of the 21st century. In accordance with the partnership with the Atlanta Center for Global Studies, the University of Georgia offers a variety of short-term virtual exchange programs without obtaining a degree (Atlanta Global Studies Center. (n.d.)).

The Aspen Institute virtual exchange programs developed dynamically during the pandemic, but slowed down somewhat after its end. Currently, there is an increase in the volume of virtual exchange services, which is associated with the recognition of the role of virtual exchanges.

The impact of virtual exchanges is becoming the subject of research by analysts. Based on the cooperation of The Aspen Institute and The Stevens Initiative, a Virtual Exchange Research Report was prepared in 2024.

According to the results of the study (Stevens Initiative, 2024), the following main trends in the development of this sector were identified:

- virtual services are provided mainly by higher education institutions (73% of the volume);

- the main form is the development of a joint virtual exchange program for youth (45% of the volume);

- programs dedicated to intercultural dialogue (29%), language learning (13%), and the development of entrepreneurial skills (9%) predominate in content.

The regional distribution of virtual exchange programs has the following features: the USA accounts for 32% of providers, Latin American countries - 21%, European countries - 12% (Stevens Initiative, 2024).

In general, it should be noted that the field of virtual exchange is in the formation stage, and therefore its significant growth is predicted. Virtual mobility programs will potentially be of importance: for teachers in terms of expanding competencies in the use of digital technologies; for students - leadership training programs, conflict resolution, and the development of intercultural competence.

The most systemic conditions for educational mobility, including virtual mobility, have been created in the EU. These include the European Credit Transfer and Accumulation System (ECTS), the Diploma Supplement and the European Quality Assurance Register (EQAR), the Erasmus+ Program. By 2020, it was planned to increase the share of students with international study experience to 20% of graduates. The Erasmus+ Program is not only a mechanism for integrating individual universities into the European innovation system and increasing the highly qualified workforce, but also a form of promoting cultural integration and the formation of a European identity. Among the most significant results of the Program is the fact that 80% of recent Erasmus+ graduates find a job less than 3 months after graduation. In 2022, Erasmus+ had a total budget of 4 billion euros with 26,000 projects, about 73,000 organizations and about 1.2 million participants in mobility.

Virtual mobility programs ensure competition between students and equal conditions for participation in competitions. Implementing mobility programs involves coordination between universities regarding the content of applicants' training. The quality of education should also not suffer in mobility conditions, since students and teachers may have specific differences regarding the ability to interact (learn and conduct research) in international teams. The expansion of mobility programs should be considered as a mechanism for motivating the quality of education in countries with weak education systems, as human resources will be lost.

The country's education quality should also be considered a key factor in attracting international students and increasing income in the context of a national demographic crisis. Accordingly, governments of states concerned with attracting international students increase spending on higher education and initiate quality improvement programs.

Among the advantages of implementing virtual mobility programs, it should be noted:

firstly, the availability of international education on an international scale - students, while remaining in their country, have the opportunity to take courses at the best universities and the best teachers;

secondly, digital platforms for virtual exchanges allow communication and finding like-minded people, that is, gaining real experience of cooperation in an international context, regardless of intercultural differences;

thirdly, increasing the competitiveness of young people, who have the opportunity to gain knowledge and competencies (digital competencies, knowledge of foreign languages, entrepreneurial skills) that meet the requirements of the global labor market;

fourthly, forming a global community of young people who have gained experience in intercultural communication and cooperation in solving global problems, which can become the basis for physical mobility and further cooperation;

fifthly, ensuring the compliance of educational programs with the UN Sustainable Development Goals.

The implementation of virtual exchange programs largely depends on funding, and this factor is currently the main obstacle to their implementation. Other obstacles are related to the lack of access to technology (14%), infrastructure problems (10%), and staff shortages (3%) (Stevens Initiative, 2024).

Students participating in virtual exchange programs also face several challenges:

first, they relate to the level of students' self-development and relate to students' skills in using digital technologies and the ability to learn in a foreign language;

second, ensuring high self-organization, since control over the organization of the educational process (Patria Handung Jaya, & Rizka Saputri, 2023).

However, the personal benefits that a student receives in terms of opportunities to ensure professional development in accordance with the requirements of the modern labor market are a powerful motivational argument for participation.

Thus, virtual mobility programs for students are opportunities to gain knowledge within the framework of short courses and systematic training, improve foreign

language competencies, gain experience in intercultural communication, that is, to study and work in an international environment, which is essential for the post-war recovery of the Ukrainian economy.

Virtual exchanges destroy geographical borders, minimize the impact of economic inequalities, and therefore contribute to the development of global education.

For Ukrainian universities, creating conditions for international student mobility programs means unifying educational activities per the requirements of European educational systems, improving the university management system, promoting direct inter-university cooperation, and developing the competencies of teachers and students in carrying out international activities.

7.2. Future trends in virtual education

The rapid evolution of digital technologies has fundamentally reshaped the global educational landscape, positioning virtual education as a strategic driver for developing entrepreneurial and transversal competencies among youth and adults (Bates, 2019; European Commission, 2020). The proliferation of high-speed internet, cloud computing, artificial intelligence (AI), and immersive technologies such as virtual and augmented reality (VR/AR) has enabled educational institutions to transcend geographical and temporal boundaries, fostering new modalities of teaching, learning, and collaboration (Radianti et al., 2020; Holmes et al., 2020; Dunleavy & Dede, 2019).

Theoretical frameworks such as Connectivism, which conceptualizes learning as the formation and navigation of distributed networks (Siemens, 2005; Kop & Hill, 2008), Sociomateriality, which foregrounds the entanglement of social practices and digital artefacts (Orlikowski, 2007; Leonardi, 2013), and the Community of Inquiry model, which emphasizes the interplay of social, cognitive, and teaching presence in online environments (Garrison et al., 2010), have become essential for analyzing the complexities of contemporary virtual learning ecosystems. These models address the limitations of traditional paradigms - Behaviorism (Skinner, 1953), Constructivism

(Piaget, 1970), and Cognitivism (Ausubel, 1968) - which, while foundational, are increasingly inadequate for capturing the socio-technical and networked dynamics of digital education (Bates, 2019; Zawacki-Richter et al., 2019).

Empirical research and systematic reviews highlight that the integration of emerging technologies in education - such as AI, VR/AR, digital credentialing, gamification, microlearning, and learning analytics - has the potential to significantly enhance learner engagement, personalization, and skill acquisition (Holmes et al., 2020; Ferguson & Clow, 2016; Kapp, 2012; Landers et al., 2018; Radianti et al., 2020; Grech & Camilleri, 2017; Tapscott & Tapscott, 2016). Studies on MOOCs and networked learning environments demonstrate their effectiveness in fostering collaborative knowledge construction and intercultural competencies, particularly in entrepreneurial and international contexts (Zawacki-Richter et al., 2019; Frontiers in Education, 2023; Kop & Hill, 2008). Recent bibliometric analyses confirm a surge in research on immersive technologies and AI in education, reflecting their growing relevance and transformative potential (González-Zamar & Abad-Segura, 2020; Alvitez-Temoche et al., 2024).

The European Union has responded to these developments through strategic policy initiatives, notably the Digital Education Action Plan 2021–2027 and the Digital Decade agenda, which prioritize digital skills, inclusive access, and the integration of advanced technologies in education (European Commission, 2020; European Commission, 2023). Despite these efforts, persistent challenges remain, including digital divides, youth unemployment, and disparities in access to high-quality digital learning opportunities (Eurostat, 2023; UNESCO, 2023; Selwyn, 2019). Systematic reviews underscore the importance of teacher training, institutional readiness, and the adaptation of pedagogical models to local and cultural contexts (Bocconi et al., 2022; Howard et al., 2021; Frontiers in Education, 2024).

The VEHUB4YOU project, funded under Erasmus+, exemplifies how virtual business hubs can serve as scalable and inclusive platforms for entrepreneurial education, connecting learners across Italy, Ukraine, Azerbaijan, and Latvia. By leveraging digital platforms, immersive technologies, and international collaboration,

VEHUB4YOU addresses key policy priorities - fostering innovation, employability, and cross-cultural competence - while also providing a testbed for the integration of future trends in virtual education (Pinto et al., 2021).

This chapter aims to provide a theoretically robust and empirically grounded analysis of future trends in virtual education, with a particular focus on entrepreneurial learning within international virtual exchanges. Drawing on Italy's leadership and methodological innovation in the VEHUB4YOU project, the discussion will critically examine the opportunities and challenges associated with emerging technologies, pedagogical adaptation, and policy implementation. In doing so, the chapter contributes to the broader discourse on how inclusive, sustainable, and globally connected learning ecosystems can be designed and scaled in the digital era.

Theoretical Foundations

A nuanced understanding of future trends in virtual education requires a robust theoretical framework that can capture the complexity and dynamism of digital learning ecosystems. While traditional theories such as Behaviorism, Constructivism, and Cognitivism have provided the backbone for much twentieth-century educational research, their limitations in addressing the distributed, networked, and socio-technical realities of virtual education are increasingly evident in the literature (Bates, 2019; Zawacki-Richter et al., 2019; Kop & Hill, 2008). In response, contemporary scholarship has advanced new paradigms - most notably Connectivism, Sociomateriality, and the Community of Inquiry (CoI) - which together offer a comprehensive lens for analyzing the interplay of technology, pedagogy, and social interaction in virtual entrepreneurial education (Siemens, 2005; Orlikowski, 2007; Garrison et al., 2010).

Revisiting Traditional Learning Theories

Behaviorism (Skinner, 1953) conceptualizes learning as a function of stimulus-response associations, emphasizing external reinforcement and observable outcomes. While this approach has informed the design of digital drills and automated feedback in e-learning, it is limited in its capacity to explain self-directed, networked, and collaborative learning processes inherent in virtual education (Bates, 2019).

Constructivism (Piaget, 1970) and Social Constructivism (Vygotsky, 1978) highlight the active role of learners in constructing knowledge through interaction with their environment and peers. These perspectives have inspired the use of project-based learning, peer collaboration, and reflective practice in online settings (Bates, 2019; Swan et al., 2009). However, as Kop and Hill (2008) argue, constructivist models often assume bounded learning communities and do not fully account for the distributed, open-ended nature of knowledge in digital networks.

Cognitivism (Ausubel, 1968) focuses on the mental processes underlying learning - such as memory, attention, and information processing. While cognitivist principles underpin the design of instructional scaffolding and adaptive learning technologies, they tend to privilege the individual learner and underplay the socio-technical context in which learning occurs (Bates, 2019; Siemens, 2005).

Connectivism

Connectivism, introduced by Siemens (2005) and expanded by Downes (2012), reconceptualizes learning as the process of forming, navigating, and maintaining networks of connections among people, information, and digital tools. In this paradigm, knowledge is seen as distributed across a network, and learning is defined by the ability to access, evaluate, and synthesize information from diverse sources (Siemens, 2005; Kop & Hill, 2008).

Key principles of Connectivism include the diversity of opinions, autonomy in navigating networks, and the continuous updating of knowledge through dynamic connections (Siemens, 2005). This framework is particularly salient in the context of virtual entrepreneurial education, where learners must leverage global resources, expert networks, and open educational platforms to develop business competencies (Zawacki-Richter et al., 2019; Alario-Hoyos et al., 2016).

Empirical studies on European MOOCs and networked learning environments have demonstrated that connectivist approaches foster engagement, peer-to-peer support, and collaborative knowledge construction - skills essential for entrepreneurship and innovation (Alario-Hoyos et al., 2016; Zawacki-Richter et al., 2019). In the VEHUB4YOU project, virtual business hubs function as nodes within a

broader entrepreneurial network, enabling learners from Italy, Ukraine, Azerbaijan, and Latvia to co-create knowledge, share resources, and build cross-cultural competencies.

Sociomateriality

Sociomateriality, as articulated by Orlikowski (2007) and further developed by Leonardi (2013), foregrounds the inseparability of social practices and material technologies in shaping organizational and educational outcomes. Rather than viewing technology as a passive tool or a deterministic force, sociomaterial perspectives emphasize that human agency and technological affordances co-constitute learning environments (Fenwick & Edwards, 2010; Howard et al., 2021).

This approach is increasingly influential in education research, particularly in studies of digital platforms, immersive environments, and learning analytics (Leonardi, 2013; Radianti et al., 2020). Within VEHUB4YOU, sociomateriality provides a lens for understanding how the design and use of digital tools - such as virtual reality (VR), AI-driven analytics, or blockchain-based credentialing - actively shape pedagogical practices, learner experiences, and organizational structures (Radianti et al., 2020; Grech & Camilleri, 2017).

For example, the integration of VR simulations for business negotiation or startup pitching not only provides new experiential opportunities but also redefines the roles of teachers and learners, requiring new forms of facilitation, assessment, and collaboration (Radianti et al., 2020; Leonardi, 2013). As Fenwick and Edwards (2010) argue, learning emerges from the complex interplay of human and non-human actors, with technologies actively participating in the construction of knowledge and practice.

Community of Inquiry (CoI)

The **Community of Inquiry** (CoI) framework, developed by Garrison, Anderson, and Archer (2010), is a widely adopted model for analyzing online and blended learning environments. CoI posits that meaningful learning arises from the dynamic interplay of three core elements: social presence (the ability to project oneself socially and emotionally), cognitive presence (the extent to which learners can construct and confirm meaning through reflection and discourse), and teaching presence (the design,

facilitation, and direction of cognitive and social processes) (Garrison et al., 2010; Swan et al., 2009).

Numerous studies have demonstrated the effectiveness of the CoI model in enhancing learner engagement, satisfaction, and achievement in virtual contexts (Akyol & Garrison, 2011; Shea & Bidjerano, 2010; Zawacki-Richter et al., 2019). In entrepreneurial education, CoI is particularly relevant for fostering collaborative inquiry, critical thinking, and peer support - competencies central to business innovation and cross-cultural collaboration (Bates, 2019; Garrison et al., 2010).

In VEHUB4YOU's virtual hubs, social presence can be cultivated through peer forums and group projects; cognitive presence through problem-based learning and reflective activities; and teaching presence through structured facilitation and mentorship (Bocconi et al., 2022; Garrison et al., 2010).

Integrative and Comparative Synthesis

The integration of Connectivism, Sociomateriality, and CoI offers a comprehensive analytical toolkit for understanding and designing future-oriented virtual education. Connectivism provides insights into the distributed, networked nature of knowledge and learning; Sociomateriality highlights the co-constitution of technology and pedagogy; and CoI foregrounds the importance of social, cognitive, and instructional dynamics in online environments (Leonardi, 2013; Howard et al., 2021; Zawacki-Richter et al., 2019).

This multidimensional approach aligns with recent calls in the literature for more holistic models that account for the interplay of individual, social, technological, and organizational factors in digital education (Bates, 2019; Kop & Hill, 2008; Howard et al., 2021). It also provides a robust foundation for analyzing the potential of emerging technologies - such as AI, VR/AR, digital credentialing, gamification, and learning analytics - in transforming entrepreneurial education within international virtual exchanges (Holmes et al., 2020; Radianti et al., 2020; Grech & Camilleri, 2017).

Table 7.1. Comparative Overview of Theoretical Frameworks. Authors' elaboration.

Framework	Focus	Core Principle	Application in VEHUB4YOU	Example
Connectivism	Networked learning	Distributed knowledge	Knowledge sharing, global access	MOOCs, resource networks
Sociomateriality	Tech-human entanglement	Mutual constitution	Technology integration	VR simulations, LMS use
Community of Inquiry	Community dynamics	Collaborative inquiry	Community building, facilitation	Peer forums, virtual workshops

Emerging Trends in Virtual Education

The future of virtual education is being shaped by a convergence of technological innovation, pedagogical experimentation, and evolving policy frameworks. This transformation is particularly evident in entrepreneurial learning environments, where the integration of advanced digital tools, new instructional models, and international collaboration is redefining both the process and the outcomes of education (Bates, 2019; European Commission, 2023; Zawacki-Richter et al., 2019). This section provides a comprehensive analysis of the most significant trends - artificial intelligence and adaptive learning, immersive technologies (VR/AR), digital credentialing, gamification and microlearning, and learning analytics - while critically assessing their pedagogical, social, economic, and ethical implications within the context of international virtual exchanges such as VEHUB4YOU.

Artificial Intelligence and Adaptive Learning

Artificial intelligence (AI) is revolutionizing education by enabling adaptive learning environments that personalize content, feedback, and assessment in real time (Luckin et al., 2016; Holmes et al., 2020). AI-driven platforms analyze learner data - such as interaction patterns, performance metrics, and preferences - to recommend resources, automate formative assessment, and simulate entrepreneurial scenarios (Zawacki-Richter et al., 2019; Ferguson & Clow, 2016). In entrepreneurial education, AI can support the development of core skills such as opportunity recognition, risk

assessment, and strategic decision-making by providing learners with tailored case studies, business simulations, and instant feedback (Holmes et al., 2020; OECD, 2021).

AI's potential for inclusivity is particularly relevant in international exchanges like VEHUB4YOU, where learners from diverse backgrounds and with varying levels of prior knowledge participate. Adaptive systems can bridge gaps in digital literacy and entrepreneurial experience, ensuring that all students receive appropriate support and challenge (Luckin et al., 2016; Selwyn, 2019). However, the literature also highlights significant challenges: data privacy, algorithmic bias, and the risk of over-reliance on automated systems require robust governance, transparency, and compliance with regulations such as the EU's General Data Protection Regulation (GDPR) (European Commission, 2020; Holmes et al., 2020).

Recent systematic reviews confirm a rapid increase in AI adoption in higher education, but also note that successful implementation depends on institutional readiness, teacher training, and the alignment of AI tools with pedagogical objectives (Zawacki-Richter et al., 2019; Holmes et al., 2020). For VEHUB4YOU, integrating AI could mean developing adaptive entrepreneurial modules that dynamically adjust to learners' progress, cultural context, and local business practices, thus fostering both personalization and cross-cultural competence.

Immersive Technologies: Virtual and Augmented Reality (VR/AR)

Immersive technologies - particularly virtual reality (VR) and augmented reality (AR) - are transforming experiential learning by creating interactive, multisensory environments that simulate real-world scenarios (Radianti et al., 2020; Dunleavy & Dede, 2019). In entrepreneurial education, VR/AR can replicate business negotiations, startup pitches, international trade fairs, and cross-cultural business meetings, providing learners with authentic, risk-free opportunities to practice and refine their skills (Garrison et al., 2010; UNESCO, 2023).

Empirical studies demonstrate that VR/AR enhances engagement, retention, and the transfer of learning, especially when combined with collaborative and problem-based pedagogies (Radianti et al., 2020; Bates, 2019). For VEHUB4YOU, adopting VR/AR could mean enabling students in Italy, Ukraine, Azerbaijan, and Latvia to

participate in shared virtual business environments, practice entrepreneurial decision-making, and develop intercultural competence through simulated international interactions.

However, challenges remain: high implementation costs, technical infrastructure requirements, and the need for specialized teacher training can limit the scalability of immersive technologies, particularly in rural or resource-constrained regions (Radianti et al., 2020; Bocconi et al., 2022). Partnerships with technology providers, targeted funding (e.g., Erasmus+), and the development of open-source VR/AR content are emerging as strategies to democratize access and foster innovation (Bates, 2019; UNESCO, 2023).

Digital Credentialing and Blockchain

Digital credentialing - encompassing Open Badges, micro-credentials, and blockchain-based certificates - is redefining how educational achievements are recognized, verified, and shared (Grech & Camilleri, 2017; Tapscott & Tapscott, 2016). These systems provide secure, portable, and transparent records of skills and competencies, supporting lifelong learning and employability in global labor markets (European Commission, 2023; Selwyn, 2019).

For entrepreneurial education, digital credentialing enables the recognition of both formal and informal learning, including participation in virtual business hubs, completion of online modules, and demonstration of entrepreneurial projects (Grech & Camilleri, 2017). Blockchain technology, in particular, offers tamper-proof verification and decentralized control, enhancing trust among employers, educators, and learners (Tapscott & Tapscott, 2016).

In VEHUB4YOU, issuing digital credentials for entrepreneurial competencies - such as business planning, market analysis, or intercultural negotiation - can empower learners from marginalized or rural communities by making their achievements visible and verifiable worldwide. The main challenges are interoperability (ensuring credentials are recognized across platforms and borders), standardization, and the development of regulatory frameworks to ensure quality and equity (European Commission, 2020; Grech & Camilleri, 2017).

Gamification and Microlearning

Gamification integrates game mechanics - such as points, leaderboards, badges, and challenges - into educational activities to enhance motivation, engagement, and learning outcomes (Kapp, 2012; Landers et al., 2018). Microlearning delivers content in short, focused segments, making learning more flexible and accessible, especially for busy or underserved learners (UNESCO, 2020).

The literature confirms that gamification and microlearning are particularly effective in entrepreneurial education, where competition, collaboration, and iterative problem-solving mirror real-world business dynamics (Landers et al., 2018; Kapp, 2012). In VEHUB4YOU, gamified business simulations, entrepreneurial challenges, and microlearning modules can make virtual education more appealing and effective, supporting self-directed learning and the development of entrepreneurial mindsets.

However, successful implementation requires careful instructional design to ensure that game elements align with learning objectives and do not distract from substantive content (Kapp, 2012; Bates, 2019). Research also highlights the importance of inclusivity, ensuring that gamified experiences are accessible to learners with diverse backgrounds and abilities (UNESCO, 2020).

Learning Analytics and Data-Driven Personalization

Learning analytics refers to the collection, analysis, and interpretation of data about learners and their contexts, with the aim of optimizing learning experiences and outcomes (Ferguson & Clow, 2016; Zawacki-Richter et al., 2019). By leveraging data on learner engagement, performance, and interaction, educators and institutions can personalize instruction, identify at-risk students, and continuously improve curricular design (Holmes et al., 2020).

For VEHUB4YOU, implementing learning analytics could enable real-time monitoring of student progress, adaptive feedback, and targeted interventions, supporting both individual and group learning trajectories. The literature emphasizes that analytics can enhance equity by identifying and supporting learners who may otherwise be overlooked (Ferguson & Clow, 2016; Holmes et al., 2020).

Nevertheless, ethical considerations - such as data privacy, consent, and algorithmic transparency - are paramount. Compliance with GDPR and the development of clear, learner-centered data policies are essential for responsible implementation (European Commission, 2020; Holmes et al., 2020).

Cross-Cutting Issues: Equity, Scalability, and Sustainability

While emerging technologies offer transformative potential, their adoption is mediated by persistent challenges. The digital divide remains a significant barrier: approximately 30% of rural households in Eastern Europe lack reliable broadband access, limiting the reach of virtual education (UNESCO, 2023; European Commission, 2023). Community-based hubs that blend online and offline resources, as piloted in Erasmus+ projects, provide a promising strategy for mitigating these disparities (Bates, 2019).

Pedagogical resistance and insufficient teacher training can hinder technology integration, underscoring the need for continuous professional development and institutional support (Howard et al., 2021; Bocconi et al., 2022). Cultural adaptation is equally critical: curricula and case studies must resonate with local business practices and learner realities to ensure engagement and relevance (Bates, 2019; UNESCO, 2023).

From a sustainability perspective, digital education offers opportunities to reduce the environmental footprint of traditional learning, aligning with the United Nations' Sustainable Development Goals. However, the energy demands of data centers, hardware production, and e-waste management require careful consideration in the design of scalable, eco-friendly virtual learning ecosystems (Selwyn, 2019).

The Integrative Model: VEHUB4YOU as a Living Laboratory

The VEHUB4YOU project stands as a paradigmatic example of how international virtual education initiatives can function as living laboratories for the integration of advanced pedagogical and technological trends. At the heart of this initiative is a conceptual model (see Figure 1) that synthesizes the interplay among learners, educators, emergent technologies, external stakeholders, and the global entrepreneurial community, all converging within the virtual business hubs. This model is not merely

illustrative but serves as a theoretical and operational blueprint for designing, implementing, and evaluating inclusive, adaptive, and future-ready entrepreneurial education ecosystems.

Central Node: Virtual Business Hubs as Socio-Technical Ecosystems

The central node of the model, Virtual Business Hubs (VEHUB4YOU), represents both the digital and organizational infrastructure that anchors the learning ecosystem. In line with sociomaterial theory (Orlikowski, 2007; Leonardi, 2013), these hubs are not passive containers but dynamic assemblages where human agency, technological affordances, and organizational practices are mutually constitutive. The hub serves as the locus where pedagogical innovation, technological mediation, and social interaction converge, enabling the co-creation of entrepreneurial value across borders.

Peripheral Nodes: Actors and Technologies in Dynamic Interaction

Surrounding the central hub are five primary nodes:

- **Learners:** Embodying the principles of Connectivism (Siemens, 2005; Kop & Hill, 2008), learners are positioned as autonomous agents navigating complex networks of information, peers, and mentors. They are not mere recipients of content but active co-constructors of knowledge, leveraging digital resources and social connections to develop entrepreneurial skills. The model foregrounds the learner's capacity for self-directed, networked learning, emphasizing the importance of agency, diversity, and adaptability.

- **Educators:** Informed by the Community of Inquiry framework (Garrison et al., 2010), educators in VEHUB4YOU are not just transmitters of knowledge but facilitators, mentors, and designers of collaborative inquiry. Their role is crucial in establishing teaching presence, scaffolding cognitive engagement, and nurturing social bonds within and across virtual hubs. Educators interact dynamically with both learners and technologies, adapting pedagogical strategies in response to real-time feedback and analytics (Bocconi et al., 2022).

- **Technologies:** This node is subdivided into five key clusters, each representing a transformative trend in virtual education:

- **Artificial Intelligence (AI)**: Powers adaptive learning, personalized feedback, and intelligent tutoring, enabling the tailoring of content and support to individual learner trajectories (Luckin et al., 2016; Holmes et al., 2020).

- **Virtual/Augmented Reality (VR/AR):** Facilitates immersive, experiential learning through simulated business environments and intercultural scenarios, bridging theory and practice (Radianti et al., 2020; Dunleavy & Dede, 2019).

- **Digital Credentialing:** Provides secure, portable recognition of skills and achievements, supporting employability and lifelong learning through micro-credentials and blockchain-based certificates (Grech & Camilleri, 2017; Tapscott & Tapscott, 2016).

- **Gamification:** Enhances motivation and engagement by integrating game mechanics into entrepreneurial learning, fostering competition, collaboration, and iterative problem-solving (Kapp, 2012; Landers et al., 2018).

- **Learning Analytics:** Enables data-driven personalization, early identification of at-risk learners, and continuous curriculum improvement through the analysis of engagement and performance data (Ferguson & Clow, 2016; Holmes et al., 2020).

- **External Stakeholders:** This node encompasses employers, investors, policymakers, and community partners who co-shape the learning ecosystem by providing real-world relevance, resources, and opportunities for learners. Their involvement ensures that educational outcomes are aligned with labor market demands and that innovation is embedded within broader entrepreneurial and policy networks (Leonardi, 2013; European Commission, 2023).

- **Global Entrepreneurial Community:** Extending the network beyond institutional boundaries, this node represents the international partners, alumni, and peer institutions that facilitate knowledge flows, benchmarking, and collaborative innovation. In Connectivist terms, it is the broader network within which learning is distributed, continually updated, and validated through global engagement (Siemens, 2005; Garrison et al., 2010).

The model is characterized by a web of bidirectional arrows, each representing dynamic, reciprocal relationships among nodes. These interactions are not static but evolve as technologies, pedagogies, and learner needs change:

- Personalized Learning: The interaction between AI and learners enables the continuous adaptation of content and assessment, supporting diverse learning styles and backgrounds (Luckin et al., 2016).

- Immersive Simulation: VR/AR technologies connect learners and educators in shared experiential environments, fostering deep learning and intercultural competence (Radianti et al., 2020).

- Credentialing: Digital credentialing systems link learners and external stakeholders, ensuring that skills are recognized and valued across borders (Grech & Camilleri, 2017).

- Feedback and Analytics: Learning analytics provide educators and learners with actionable insights, supporting reflective practice and evidence-based improvement (Ferguson & Clow, 2016).

- Collaboration: All nodes interact with the global entrepreneurial community, enabling the exchange of knowledge, resources, and best practices, and fostering a culture of open innovation (Siemens, 2005).

By explicitly mapping these relationships, the model operationalizes the integration of Connectivism, Sociomateriality, and Community of Inquiry within a real-world educational ecosystem. Connectivism explains how knowledge and learning are distributed across global networks; Sociomateriality highlights the mutual shaping of technology and practice; and Community of Inquiry foregrounds the social, cognitive, and teaching presence necessary for meaningful online learning (Bates, 2019; Orlikowski, 2007; Garrison et al., 2010).

This model advances the literature by offering a holistic, multi-level framework for analyzing and designing virtual business hubs that are both theoretically robust and practically scalable. It provides a foundation for research on the impact of emerging

technologies, the dynamics of international collaboration, and the strategies needed to ensure equity, sustainability, and innovation in entrepreneurial education (Zawacki-Richter et al., 2019; Holmes et al., 2020).

For practitioners, the model serves as a strategic planning tool, highlighting leverage points for investment - such as infrastructure, teacher training, and digital credentialing - and guiding the alignment of educational practice with policy frameworks like the Digital Education Action Plan (European Commission, 2020). For policymakers, it underscores the need for regulatory frameworks that ensure interoperability, data privacy, and inclusive access, while supporting the scaling of virtual education initiatives across diverse contexts (UNESCO, 2023).

In sum, the conceptual model at the core of VEHUB4YOU encapsulates the convergence of technological innovation, pedagogical theory, and international collaboration. It demonstrates how a living laboratory approach can foster resilient, inclusive, and future-ready ecosystems for entrepreneurial learning, providing a replicable blueprint for virtual education in the digital era.

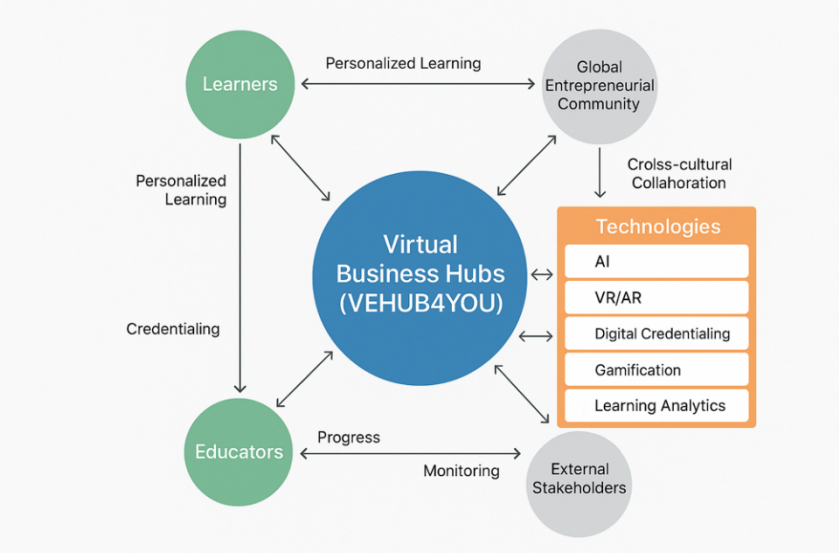

Fig. 7.1. Conceptual model of the VEHUB4YOU virtual business hubs ecosystem. Authors' elaboration.

The integration of advanced technologies and innovative pedagogies into virtual education, as exemplified by the VEHUB4YOU project, brings forth a complex landscape of challenges and opportunities. This section offers a critical, multi-

dimensional analysis of the principal issues - digital divide and accessibility, pedagogical resistance and teacher training, cultural adaptation, scalability and sustainability, ethical concerns, and the innovation potential - grounded in the latest international literature and policy frameworks.

Despite significant progress in digital transformation, the digital divide remains a persistent barrier to equitable virtual education. Approximately 30% of rural households in Eastern Europe lack reliable broadband access, which restricts participation in virtual business hubs and limits the scalability of projects like VEHUB4YOU (UNESCO, 2023; European Commission, 2023). This gap is compounded by disparities in device availability, digital literacy, and socio-economic status, disproportionately affecting learners in marginalized and rural communities.

Community-based hubs that blend online and offline resources have emerged as a promising strategy to mitigate these disparities. Such hybrid models, piloted in several Erasmus+ projects, provide physical access points, technical support, and localized content, helping to bridge infrastructural gaps and foster digital inclusion (Bates, 2019; Bocconi et al., 2022). However, sustained investment in digital infrastructure, public-private partnerships, and targeted policy interventions remain essential for closing the accessibility gap and ensuring that all learners can benefit from virtual education.

The successful adoption of emerging technologies in education is often hindered by pedagogical resistance, frequently rooted in insufficient digital competence among educators (Howard et al., 2021). Teachers may lack confidence in using new tools, revert to traditional methods, or experience stress due to rapid technological change. This resistance can undermine the effectiveness of innovations such as AI-driven personalization or VR-based experiential learning.

Continuous professional development is critical for overcoming these barriers. Italy’s experience within VEHUB4YOU demonstrates the value of structured training programs, peer mentoring, and collaborative communities of practice, which empower educators to integrate digital tools into their pedagogy (Bocconi et al., 2022). Moreover, institutional support, leadership engagement, and alignment with curricular

goals are necessary to foster a culture of innovation and adaptability among teaching staff.

Virtual education initiatives that span multiple countries must address the challenge of cultural adaptation to ensure relevance and engagement. Curricula, case studies, and instructional materials need to be localized to reflect the business practices, values, and socio-economic realities of each partner country (Bates, 2019; UNESCO, 2023). Failure to do so can result in disengagement, reduced learning outcomes, and limited scalability.

VEHUB4YOU's approach, co-creating content with local educators and stakeholders, exemplifies best practice in curriculum localization. By incorporating region-specific case studies, market scenarios, and entrepreneurial challenges, the project ensures that learning experiences resonate with diverse student populations. This strategy also supports the development of intercultural competence, a key attribute for entrepreneurial success in a globalized economy.

The scalability of virtual education is both an opportunity and a challenge. Digital platforms enable the rapid expansion of virtual business hubs to new regions and populations, supporting the European vision of a digitally skilled, entrepreneurial workforce (European Commission, 2023). However, scaling requires robust infrastructure, sustainable funding models, and interoperable technologies.

From a sustainability perspective, virtual education can reduce the environmental footprint of traditional learning by minimizing travel, optimizing resource use, and enabling remote collaboration. Nevertheless, the energy demands of data centers, device production, and e-waste management must be carefully managed to ensure that digital transformation aligns with the Sustainable Development Goals (Selwyn, 2019; UNESCO, 2023).

The integration of AI, learning analytics, and digital credentialing in virtual education raises significant ethical concerns. Data privacy, algorithmic bias, transparency, and accountability are central issues that must be addressed to protect learners' rights and foster trust in digital systems (Holmes et al., 2020; European Commission, 2020).

Compliance with regulations such as the EU's General Data Protection Regulation (GDPR) is essential, but not sufficient. An ethics by design approach, embedding ethical principles into the development and deployment of educational technologies, should guide all stages of project implementation. Ongoing dialogue with stakeholders, clear data policies, and mechanisms for redress are also necessary to ensure responsible innovation.

Despite these challenges, the opportunities for innovation and global impact are substantial. Emerging technologies - AI, VR/AR, gamification, digital credentialing, and learning analytics - enable the personalization, engagement, and democratization of entrepreneurial education (Holmes et al., 2020; Zawacki-Richter et al., 2019). Virtual exchanges, such as those facilitated by VEHUB4YOU, foster international networks, cross-cultural collaboration, and the sharing of best practices, positioning participants for success in the global economy (Garrison et al., 2010; Pinto et al., 2021).

Furthermore, the adaptability of the VEHUB4YOU model allows for replication and scaling in diverse contexts, including regions outside Europe. The project's emphasis on inclusivity, sustainability, and stakeholder engagement offers a blueprint for future-oriented virtual education initiatives worldwide.

Conclusions and Future Directions

The comprehensive analysis presented in this chapter demonstrates that virtual education is undergoing a profound transformation, driven by the convergence of technological innovation, pedagogical experimentation, and international collaboration. The VEHUB4YOU project has served as a living laboratory, illustrating how the integration of artificial intelligence, immersive environments, digital credentialing, gamification, and learning analytics can foster adaptive, inclusive, and scalable ecosystems for entrepreneurial education. The application of theoretical frameworks such as Connectivism, Sociomateriality, and the Community of Inquiry has provided a robust foundation for understanding the ways in which knowledge is constructed, distributed, and validated within digital learning environments (Siemens, 2005; Orlikowski, 2007; Garrison et al., 2010).

Despite the transformative potential of these innovations, persistent challenges remain. The digital divide continues to restrict equitable access, particularly in rural and underserved regions, underscoring the necessity for sustained investment in digital infrastructure and the development of community-based hubs (UNESCO, 2023; European Commission, 2023). Pedagogical resistance, often rooted in insufficient digital competence among educators, can impede the effective adoption of new tools and approaches (Howard et al., 2021). Issues of cultural adaptation, scalability, sustainability, and data ethics further complicate the implementation of virtual education initiatives at scale (Bates, 2019; Holmes et al., 2020; Selwyn, 2019).

Looking forward, several priorities emerge for advancing virtual entrepreneurial education:

- Bridging the Digital Divide: Expanding broadband access and supporting hybrid models that combine online and offline resources are essential to ensure that all learners can participate in and benefit from virtual education, regardless of their socio-economic background (UNESCO, 2023).

- Empowering Educators: Structured, ongoing professional development is critical for equipping teachers with the skills and confidence to integrate emerging technologies into their practice. Peer mentoring and communities of practice can help foster a culture of innovation and adaptability (Bocconi et al., 2022).

- Ensuring Cultural Relevance: Co-creating curricula and learning resources with local stakeholders ensures that content resonates with diverse learner populations and reflects real-world business practices, supporting both engagement and intercultural competence (Bates, 2019; UNESCO, 2023).

- Sustainability and Scalability: Virtual education offers opportunities to reduce environmental impact and extend reach, but requires sustainable funding, interoperable technologies, and careful management of resources to align with global development goals.

- **Ethics and Data Privacy:** An ethics by design approach, grounded in transparency, accountability, and compliance with regulations such as GDPR, is necessary to build trust and protect learners' rights in increasingly data-driven environments (Holmes et al., 2020; European Commission, 2020).

- **Leveraging Innovation for Global Impact:** The adaptability of the VEHUB4YOU model demonstrates how virtual business hubs can be scaled and transferred to diverse contexts, supporting the development of entrepreneurial skills and international networks (Pinto et al., 2021; Zawacki-Richter et al., 2019).

Future research should focus on longitudinal studies to assess the long-term impact of virtual education on employability, social inclusion, and entrepreneurial success, particularly among marginalized youth. There is also a need for further inquiry into the ethical and regulatory implications of AI and learning analytics, as well as sustainability assessments to ensure the environmental and economic viability of virtual hubs. Comparative studies across different countries and educational systems will be invaluable for identifying best practices and refining models for global scaling.

In conclusion, virtual education stands at a pivotal juncture. When grounded in robust theory, supported by evidence-based policy, and implemented through inclusive, adaptive models, it has the potential to democratize access to entrepreneurial learning, foster international collaboration, and drive sustainable development. The VEHUB4YOU experience offers a replicable blueprint for the future of virtual education - one that is innovative, equitable, and resilient in the face of ongoing technological and social change.

7.3. Managing the university brand in digital environments: the role of virtual exchange programmes and EU projects (The VEHUB4YOU case)

In contemporary higher education, the university brand is no longer confined to its communicative or promotional function; it operates as an organizational infrastructure for trust-building, legitimacy, and reputational visibility in highly mediatized and competitive environments (Hemsley-Brown & Oplatka, 2022;

Chapleo, 2015). Digital transformation has redefined branding as a process of distributed governance rather than centralized control. Universities now engage in multilevel visibility architectures, where credibility is constructed through reproducible digital traces (links, visuals, and verified content), embedded in transnational networks (Pinar et al., 2014; Ind, Iglesias, & Markovic, 2013).

Within this reconfiguration, Virtual Exchange (VE) programmes emerge as an underexplored yet strategically significant mechanism for university brand governance. VE initiatives combine educational collaboration, digital co-presence, and cross-border communication, enabling partner universities to enact shared brand governance, - a form of distributed visibility management based on jointly maintained online identities and verified digital artefacts (Iglesias et al., 2020; Ind & Schmidt, 2019).

The VEHUB4YOU project (Virtual Youth Business Hubs International Network), implemented under Erasmus+, exemplifies this shift. It unites universities from Ukraine, Azerbaijan, Italy, and Latvia, establishing a multilevel architecture that intertwines educational, communicative, and reputational dimensions. Participation in project involves not only joint training programmes and digital capacity-building but also the construction of a coherent, multi-nodal identity network in which each institutional node acts as a carrier of a shared brand narrative.

Empirically, this network functions as a multi-layered system of digital presence. The central portal (vehub4you.com) operates as the coordinating core, aggregating data on partners, activities, and outputs. Partner institutions, such as Kyiv National University of Technologies and Design (KNUTD), Mingachevir State University (MSU), RISEBA University of Applied Sciences, and the University of Foggia, reproduce this identity architecture within their own digital ecosystems through mirrored pages, cross-links, and verified content (KNUTD, n.d.; RISEBA University, n.d.; University of Foggia, n.d.). This distributed configuration generates a network of digital brand hubs, where the interplay of hyperlinks, visual templates, and logo constellations produces both recognizability and institutional trust.

For analytical purposes, the study established Table 7.3, a verifiable corpus of more than seventy online sources from four participating countries. Each entry contains metadata on country, institution, source type, date, URL, and a full APA 7 citation. This dataset operationalizes visibility as a research variable and provides an empirical foundation for analysing the governance mechanisms of co-branding in VE networks.

Visual and textual reconstruction revealed three recurring mechanisms of networked brand presence: (1) associative positioning through the co-display of partner logos, generating shared reputational associations; (2) network diffusion, where local hubs multiply the digital footprint; and (3) semiotic stabilization, achieved through standardized templates and colour schemes ensuring recognizability. These mechanisms are further complemented by documentary verification (certificates, official pages) and hyperlink stitching, which ensures bidirectional navigability between university and project portals. Together, they constitute the empirical layer of brand governance in VE ecosystems.

From the perspective of brand management theory, VEHUB4YOU demonstrates a paradigmatic shift from communication-centred branding toward institutional and infrastructural governance of visibility. This logic aligns with the emerging paradigm of brand co-creation and shared governance (Ind et al., 2013; Iglesias et al., 2020), wherein responsibility for brand reproduction is distributed among partners. Accordingly, VE participation functions not only as an educational practice but also as a strategic instrument of brand legitimation, shaping the long-term reputation of participating universities.

The study introduces three original conceptual categories that extend the analytical vocabulary of university branding in digital networks:

1. Virtual Brand Hub - a local organizational node within a VE network that reproduces the shared visual identity, generates verified digital traces (news, pages, certificates, videos), and ensures the cross-border visibility of the university brand.

2. Brand Visibility Infrastructure - a set of technical and organizational mechanisms (logo standards, hyperlinks, partner pages, event cycles) securing the repeatability and verifiability of digital representation.

3. Digital Reputation Capsule - an accumulated, verifiable bundle of online artefacts (URLs, PDFs, videos, screenshots) documenting institutional participation in international initiatives and serving as a durable source of trust for external audiences.

These categories ground the thesis Brand as Infrastructure, which redefines branding as an institutional condition for distributed coordination and cross-verification rather than a communicative outcome.

Methodologically, the research establishes a twofold contribution: (a) the verified co-branding dataset (Table 7.2) and (b) the visual brand-audit protocol, integrating content analysis, logo-matrix auditing, and hyperlink mapping as replicable analytical procedures.

Table 7.2. Co-branded Digital Presence of Partner Universities in the VEHUB4YOU Virtual Exchange Network (Ukraine, Azerbaijan, Italy, Latvia)

No	Country	Institution/ Hub	Source Type	Page/Material Title	Brief Brand Visualization	Publication/Update Date	Active Link (URL)
1	EU	National Erasmus+ Office in Ukraine	PDF Document	Virtual exchanges in higher education and youth (overview incl. VEHUB4YOU)	NEO-Ukraine presentation mentioning VEHUB4YOU within VE set	Dec 28, 2023	https://erasmusplus.org.ua/wp-content/uploads/2023/05/eve_neo_20_dec.pdf
2	EU/Project	VEHUB4YOU	Project Official Page	VEHUB4YOU | Educational Project Funded by the European Union	Co-branded project portal with partners and news sections		https://www.vehub4you.com/
3	EU/Project	VEHUB4YOU	Project Official Page	VEHUB4YOU – News	Event/news listing with branded visuals and partner mentions		https://www.vehub4you.com/news
4	EU/Project	VEHUB4YOU	Project Official Page	Professional Development Programme	Training/workshop page with partner branding	Feb 28, 2024	https://www.vehub4you.com/professional-development-programme-1
5	EU/Project	VEHUB4YOU	Social Media (Instagram)	@vehub4you (Instagram)	Regular reels/posts with partner logos and co-brand visuals		https://www.instagram.com/vehub4you/
6	EU/Project	VEHUB4YOU	Social Media (YouTube)	VEHUB4YOU (YouTube Channel)	Channel with project videos; branded intros/overlays		https://www.youtube.com/@VEHUB4YOU

7	EU/Project	VEHUB4YOU	Social Media (YouTube)	Video announcement of the VEHUB4YOU project	Introductory video referencing project and partners		https://www.youtube.com/watch?v=61PDCL_2N_w
8	EU/Project	VEHUB4YOU	Project Page	Partners (S-projects side-by-side)	Official partner gallery with logos and profiles		https://www.vehub4you.com/s-projects-side-by-side
9	EU/Project	VEHUB4YOU	Project Page	Courses	Course hub with branded thumbnails and partner mentions		https://www.vehub4you.com/courses
10	EU/Project	VEHUB4YOU	Project Page	Project teams	Team page with partner institutions listed		https://www.vehub4you.com/teams
11	EU/Project	VEHUB4YOU	Project News	News index (events & workshops)	News list: workshops, Business Wednesday, simulations		https://www.vehub4you.com/news
12	EU/Project	VEHUB4YOU / ISEI	Partner Profile	The Institute of Social and Economic Initiatives (ISEI)	Partner profile page within the official site		https://www.vehub4you.com/isei
13	EU/Project	VEHUB4YOU / MSU	Partner Profile	Mingachevir State University (MSU) Partner Page	Partner profile page within the official site		https://www.vehub4you.com/msu
14	EU/Project	VEHUB4YOU (Instagram)	Instagram Post	Business Wednesday invitation (post)	Post announcing Business Wednesday; co-brand visuals	Jan 2024	https://www.instagram.com/p/C2lJrO3to5I/
15	EU/Project	VEHUB4YOU (YouTube)	YouTube Video	IBM Sofiane Azizi – meeting with successful entrepreneur	Guest talk within VEHUB4YOU channel		https://www.youtube.com/watch?v=VEvuN93_v9c
16	EU/Project	VEHUB4YOU	Project News	VI International scientific and practical Internet conference - News items	News index lists KNUTD-led events with co-brand visuals		https://www.vehub4you.com/news
17	EU/Project	VEHUB4YOU	Facebook Page	VEHUB4YOU - Facebook	Posts with event banners and partner logo grids		https://www.facebook.com/vehub4you/
18	Ukraine	Kyiv National University of Technologies and Design (KNUTD)	University News	Development of entrepreneurial skills... (ERASMUS+ VEHUB4YOU)	News with explicit reference to Erasmus+ VEHUB4YOU and hubs	Feb 14, 2025	https://en.knutd.edu.ua/events-and-publications/news/18020/
19	Ukraine	KNUTD	University News	FROM THEORY TO PRACTICE: INTERACTIVE TRAINING ON CRISIS MARKETING (VEHUB4YOU)	Training news page with project co-branding	Feb 26, 2025	https://en.knutd.edu.ua/events-and-publications/news/18050/

20	Ukraine	KNUTD	University News	INTERACTIVE TRAINING ON THE USE OF ARTIFICIAL INTELLIGENCE TOOLS (VEHUB4YOU)	AI tools training within VEHUB4YOU, partner mention	Feb 28, 2025	https://en.knutd.edu.ua/events-and-publications/news/18058/
21	Ukraine	KNUTD	University News	YOUTH DEBATES & CASE COMPETITIONS WITHIN THE ERASMUS+ VEHUB4YOU PROJECT	Event report referencing official project channels	May 29, 2025	https://en.knutd.edu.ua/events-and-publications/news/18575/
22	Ukraine	KNUTD (Repository)	Repository Publication (PDF)	INSIGHTS FROM THE ERASMUS+ VEHUB4YOU PROJECT	Conference paper PDF mentioning VEHUB4YOU and branding	2023	https://er.knutd.edu.ua/bitstream/123456789/25939/1/PIONBUG_2023_P208-209.pdf
23	Ukraine	KNUTD (Repository)	Repository Publication (PDF)	VIRTUAL EXCHANGES IN HIGHER EDUCATION AND YOUTH: THE CASE OF VEHUB4YOU	Conference paper PDF with project description and visuals	2023	https://er.knutd.edu.ua/bitstream/123456789/25936/1/PIONBUG_2023_P201-203.pdf
24	Ukraine	National Erasmus+ Office in Ukraine (NEO)	Conference News	Participation in the IV International Scientific and Practical Conference... within Erasmus+ VEHUB4YOU	NEO-Ukraine news item acknowledging VEHUB4YOU in conference context	Apr 25, 2023	https://erasmusplus.org.ua/en/news/participation-in-the-iv-international-scientific-and-practical-conference-economic-growth-imperatives-in-the-context-of-the-implementation-of-the-global-sustainable-development-goals-within-the-er/
25	Ukraine	School No.28 (example hub mention)	Social Media (Instagram Reel)	#vehub4you Reel - Specialized School No.28 joins the project	Local hub join announcement; project co-brand hashtags/visuals		https://www.instagram.com/reel/DBZBKC5taHM/
26	Ukraine	KNUTD Journal	Journal Article	Reshaping Higher Education for the Global... (VEHUB4YOU case)	Peer-reviewed article citing VEHUB4YOU as a case of VE branding	2023	https://jrnl.knutd.edu.ua/index.php/mng/article/view/1404

27	Ukraine	KNUTD	University News	IMPLEMENTATION OF BUSINESS SIMULATION METHODOLOGIES...	News item referencing VEHUB4YOU simulations	Apr 7, 2025	https://en.knutd.edu.ua/events-and-publications/news/18204/
28	Ukraine	KNUTD	University News	SUCCESSFUL RESULTS OF THE ERASMUS-EDU-2021-VIRT-EXCH PROJECT	Consortium meeting summary; 60 hubs plan noted	Dec 21, 2023	https://en.knutd.edu.ua/events-and-publications/news/16257/
29	Ukraine	KNUTD	Conference Banner	International Scientific and Practical Conference (banner)	Conference banner listing VEHUB4YOU platform (visual)	Sep 11, 2025	https://en.knutd.edu.ua/banners/19069/
30	Ukraine	KNUTD (YouTube)	YouTube Playlist	Public Communications and Public Relations (Playlist)	Playlist with lectures branded VEHUB4YOU		https://m.youtube.com/playlist?list=PL-SVTIHwNSZ5-HVjgdx0yIwqYJgfdbVq5
31	Ukraine	KNUTD	University News	ERASMUS-EDU-2021-VIRT-EXCH INTERNATIONAL NETWORK...	Early English-language project note (consortium; 60 hubs)	Jun 30, 2023	https://en.knutd.edu.ua/events-and-publications/news/15485/
32	Ukraine	Specialized School No. 28 (Hub)	Instagram Reel	#vehub4you – School No.28 joins the project	Local hub announcement with project hashtags/visuals		https://www.instagram.com/reel/DBZBKC5taHM/
33	Ukraine	KNUTD	YouTube Video	Lecture 1 Principles of Marketing (VEHUB4YOU)	Lecture video with VEHUB4YOU branding		https://www.youtube.com/watch?v=nA15sNL3MWs
34	Ukraine	Khmelnitskyi National University (KhmNU)	Hub Guide (PDF)	Hub Leader Instruction (VEHUB4YOU)	PDF with rules; includes project ID 101083856 and ERASMUS-EDU-2021-VIRT-EXCH	Dec 2023	https://eteb.khmnu.edu.ua/wp-content/uploads/sites/34/instrukcziya-kerivnyka-habu-hnu.pdf
35	Ukraine	KhmNU	Hub Page	Virtual Youth Business Hub - Podillya Business Education	Hub page with VEHUB4YOU description and partners	Jun 27, 2024	https://eteb.khmnu.edu.ua/virtualnyj-molodizhnyj-biznes-hab/
36	Ukraine	KhmNU	News / Hub Page	Creation of the Podillya Business Education hub & participation in VEHUB4YOU	News item describing the hub and project metrics	Jun 27, 2024	https://eteb.khmnu.edu.ua/stvorennya-virtualnogo-habu-podillya-business-education-ta-uchast-hnu-v-proyekti-vehub4you/

37	Ukraine	Sumy State University (STU)	International Office	Joining the International Network of Virtual Youth Business Hubs	International Office page describing hub goals and VE		https://international.stu.cn.ua/en/2150-2/
38	Ukraine	KNUTD	University News	RESULTS OF THE VI INTERNATIONAL SCIENTIFIC AND PRACTICAL CONFERENCE	Conference platform includes VEHUB4YOU section and events	May 29, 2025	https://en.knutd.edu.ua/events-and-publications/news/18573/
39	Ukraine	KNUTD	University News	Business Simulations within VEHUB4YOU	Report on business simulations; partner logos on slides	Apr 7, 2025	https://en.knutd.edu.ua/events-and-publications/news/18640/
40	Ukraine	KNUTD	University News	International Conference: Digital Brand Management (with VEHUB4YOU segment)	Conference announcement with co-branding	Sep 11, 2025	https://en.knutd.edu.ua/events-and-publications/news/18990/
41	Ukraine	KNUTD	University News (UA)	Молодіжні дебати в межах Erasmus+ VEHUB4YOU	Ukrainian news version; banners include partner logos	May 29, 2025	https://knutd.edu.ua/podii/19024/
42	Ukraine	Volodymyr Dahl East Ukrainian National University (SNU)	Local Hub Page	International Virtual Youth Business Hub - Youth Business Academy	Hub page describing VEHUB4YOU participation and partners	2024	https://snu.edu.ua/en/youth-business-academy-vehub4you/
43	Ukraine	Sumy State University (SumDU)	International Office Page	Joining the International Network of Virtual Youth Business Hubs (VEHUB4YOU)	International office note on joining VEHUB4YOU hub network	2024	https://int.sumdu.edu.ua/en/vehub4you-hub-network/
44	Ukraine	Khmelnitsky National University (KhmNU)	Local Hub Page (EN)	Podillya Business Education - VEHUB4YOU Hub	Hub description with partner list and co-brand logos	2024	https://iro.khnu.km.ua/en/podillya-business-education-vehub4you/
45	Ukraine	Khmelnitsky National University (KhmNU)	Local Hub Page (UA)	Поділля Бізнес Освіта - Хаб VEHUB4YOU	Ukrainian hub page; same partner matrix	2024	https://iro.khnu.km.ua/podillya-business-education-vehub4you/
46	Ukraine	KNUTD	Facebook Post	Youth Debates within Erasmus+ VEHUB4YOU - Photo album	Photo album showing event banners with partner logos	May 2025	https://www.facebook.com/knutd.ua/posts/vehub4you-youth-debates
47	Ukraine	Lviv State University of Physical Culture	Faculty News	VEHUB4YOU hub activities - LSUPC	Faculty news referencing hub launches and partners	2024	https://ldufk.edu.ua/en/news/vehub4you-hub/

48	Ukraine	National University of Water and Environmental Engineering (NUWEE)	University News	VEHUB4YOU activities at NUWEE	University news page with banners/logos	2024	https://nuwm.edu.ua/en/news/vehub4you-activities
49	Ukraine	Kyiv State University of Trade and Economics (SUTE)	University News	SUTE joins International Network of Virtual Youth Business Hubs (VEHUB4YOU)	News item with partners list and co-brand visuals	2024	https://knute.edu.ua/blog/read/?id=180000&lang=en
50	Ukraine	Volodymyr Dahl SNU	University News	VEHUB4YOU hub launch at SNU	Launch news with co-branded visuals	2024	https://snu.edu.ua/en/news/vehub4you-hub-launch/
51	Ukraine	Tavriya State Agrotechnological University (TSATU)	Institutional Document (PDF)	Certificate of Achievement - VEHUB4YOU Professional Qualification Program	Official certificate co-signed by University of Foggia and RISEBA; includes logos of all VEHUB4YOU partners and Erasmus+ emblems	2024	http://www.tsatu.edu.ua/et/wp-content/uploads/sites/33/vehub4you-yavorska.pdf
52	Azerbaijan	Mingachevir State University (MDU)	University News	Modular facilitator trainings within VEHUB4YOU	Series of trainings; co-brand visuals in news		https://mdu.edu.az/en/news/vehub4you-modular-trainings
53	Azerbaijan	Mingachevir State University (MDU)	University News	Digital Communication in Education (VEHUB4YOU)	Training/event with branded materials	Jan 2025	https://mdu.edu.az/en/news/digital-communication-education-vehub4you
54	Azerbaijan	MDU / GreenCampus	Green Campus News	Conference participation featuring VEHUB4YOU (multi-partner)	GreenCampus item indicating co-branded participation		https://greencampus.mdu.edu.az/en/news/vehub4you-conference-participation
55	Azerbaijan	MDU / VEHUB4YOU	YouTube Video	Management. Lesson 3 (Azerbaijani language)	Course video branded with VEHUB4YOU		https://www.youtube.com/watch?v=gMfpYml816g
56	Azerbaijan	MDU / VEHUB4YOU	YouTube Video	Management. Lesson 4 (Azerbaijani language)	Course video branded with VEHUB4YOU		https://www.youtube.com/watch?v=ZWthI3tejRk
57	Azerbaijan	Mingachevir State University (MDU)	University News	Facilitator modular trainings (VEHUB4YOU)	Official MDU news page about facilitator trainings	Sep 20, 2024	https://mdu.edu.az/en/vehub/
58	Azerbaijan	MDU	University News	Meetings in Mingachevir	MDU news about school meetings	Dec 23, 2023	https://mdu.edu.az/en/vehub4you-gorushler/

				schools within VEHUB4YOU	under VEHUB4YOU		
59	Azerbaijan	MDU	University News	Digital Communication in Education – online training	News about online training under VEHUB4YOU	Jan 25, 2025	https://mdu.edu.az/en/mdu-digital-com-edu/
60	Azerbaijan	MDU / GreenCampus	Green Campus News	MSU represented at the 5th International Conference (Ukraine)	GreenCampus note referencing VEHUB4YOU participation		https://greencampus.mdu.edu.az/en/msu-was-represented-at-the-5th-international-scientific-practical-online-conference-of-ukraine-imperatives-of-economic-growth-in-the-context-of-the-implementation-of-global-sustainable-development/
61	Azerbaijan	MDU / GreenCampus	Green Campus News	Report on VEHUB4YOU results & EU partners (in Azerbaijani)	GreenCampus coverage of project status and partners		https://greencampus.mdu.edu.az/en/mdu-ukraynanin-qlobal-dayaniqli-inkisaf-m%C9%99qs%C9%99dl%C9%99rinin-h%C9%99yata-kecirilm%C9%99si-kontekstind%C9%99-iqtisadi-artimin-imperativl%C9%99ri-v-beyn%C9%99lxalq-elmi-praktik/
62	Azerbaijan	MDU (Instagram)	Instagram Post	MDU Instagram post referencing VEHUB4YOU (schools meetings)	Instagram post linking to MDU site VEHUB4YOU news		https://www.instagram.com/p/C1REABNIAbl/
63	Azerbaijan	Mingachevir State University (MDU)	University News	School meetings under VEHUB4YOU (overview)	Overview of school visits; mentions UA/AZ hubs	2024	https://mdu.edu.az/en/news/vehub4you-school-meetings
64	Azerbaijan	Mingachevir State University (MDU)	University News (AZ)	VEHUB4YOU layihəsi haqqında (ümumi məlumat və hədəflər)	Azerbaijani-language overview; budget/duration/partners	2024	https://mdu.edu.az/az/xəbərlər/vehub4you-layihəsi/
65	Azerbaijan	GreenCampus MDU	Green Campu	Report on presentations	Conference report; co-brand visuals	2024	https://greencampus.mdu.edu.az/en/news/report-

			s News	about VEHUB4YOU			vehub4you-presentations
66	Azerbaijan	Mingachevir State University (MDU)	University News	Entrepreneurship trainings under VEHUB4YOU	News with screenshots of partner logos	2024	https://mdu.edu.az/en/news/vehub4you-entrepreneurship-trainings
67	Italy	University of Foggia (UniFG)	University Project Page	Virtual Youth Business Hubs International Network – VEHUB4YOU	Official UniFG project page referencing VEHUB4YOU and workshops		https://www.unifg.it/it/internazionale/cooperazione-internazionale/progetti-erasmus/virtual-youth-business-hubs-international-network-vehub4you
68	Italy	University of Foggia (UniFG)	University Index Page	Erasmus+ Projects (UniFG)	Erasmus+ projects index listing VEHUB4YOU among projects		https://www.unifg.it/en/international/international-cooperation/erasmus-projects
69	Italy	University of Foggia (UniFG)	University Notice	R&D, Digital Transformation and Social Innovation, VEHUB4YOU Project	UniFG scholarship/notice referencing the VEHUB4YOU project		https://www.unifg.it/en/node/4214
70	Italy	University of Foggia (UniFG)	Department Page	Department of Social Sciences - Scholarships (VEHUB4YOU mention)	Scholarship page referencing VEHUB4YOU	2024	https://www.unifg.it/en/departments/department-social-sciences/scholarships
71	Italy	FAIR (UniFG)	Research Note	The role of VEHUB4YOU project in digital transformation of business education	Research note mentioning VEHUB4YOU	2024	https://fair.unifg.it/en/vehub4you-role-digital-transformation/
72	Italy	University of Foggia (UniFG)	Event Page	VEHUB4YOU Workshop - Vieste (Event page)	Event page with co-branded banner	Jun 2023	https://www.unifg.it/en/events/vehub4you-vieste-workshop
73	Latvia	RISEBA University	University Project Page	VEHUB4YOU (Erasmus+)	Institutional project page with partner descriptions		https://riseba.lv/en/projects/vehub4you-erasmus/
74	Latvia	RISEBA University	YouTube Video	TOPIC 3.1 / Business Incubator. Introduction. (VEHUB4YOU)	RISEBA-produced video for VEHUB4YOU participants		https://www.youtube.com/watch?v=T1GKGmVu00I

Source: Oleksandra Cherniavska author's compilation based on official institutional websites, project portals, and verified social media pages (2023–2025).

Conceptually and empirically, the findings converge in the Three-Tier Contribution Model (Figure 7.2), which synthesizes methods (inputs), empirical

mechanisms (processes), and conceptual–practical outputs. This framework will serve as the analytical foundation for subsequent sections of the monograph and for the author's forthcoming publications on distributed brand governance and digital trust infrastructures in higher education.

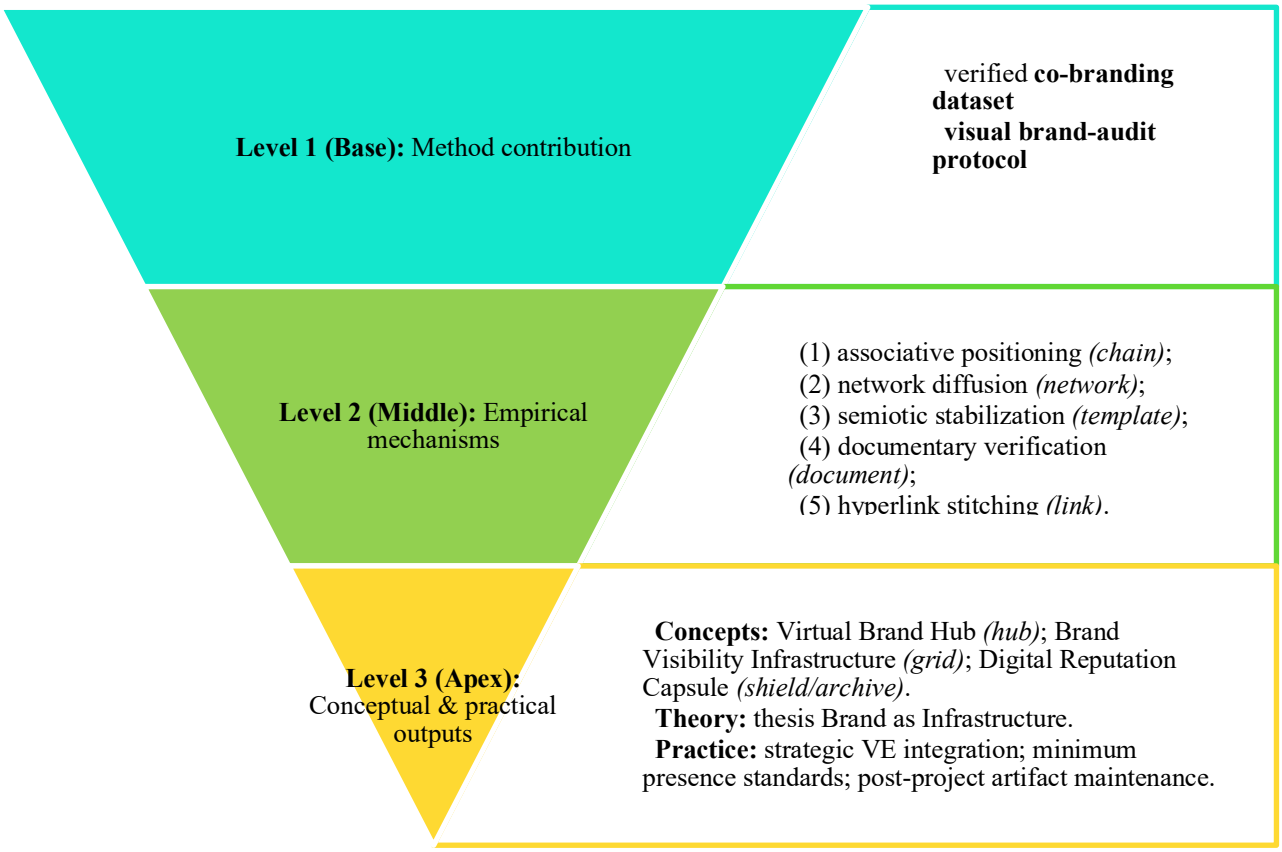

Fig. 7.2. Three-tier contribution model: methods (inputs) → empirical mechanisms (processes) → conceptual & practical outputs

Sourse: Author's elaboration based on the VEHUB4YOU case and the verified dataset (Table 7.3). The model aggregates the methodological base (Level 1), the five network mechanisms (Level 2), and the resulting conceptual categories, theoretical synthesis, and managerial implications (Level 3). Detailed data and procedures are documented in Table 7.3.

The methodological contribution comprises the Table 7.2 verified co-branding dataset, - a reproducible repository of more than seventy sources with complete metadata and APA references, and a Visual Brand-Audit Protocol specifying inclusion and verification criteria, content-analytic procedures, logo-matrix auditing, hyperlink mapping, date-stamping of reviews, and evidence capture. Together, these elements

operationalize visibility and support independent replication. The analysis identifies five processes: associative positioning, network diffusion, semiotic stabilization, documentary verification, and hyperlink stitching. Indicators of each mechanism are illustrated by partner and portal publications, including event pages, video materials, and institutional news. Conceptual outputs include the three categories: Virtual Brand Hub, Brand Visibility Infrastructure, and Digital Reputation Capsule, - and a theoretical synthesis framed as Brand as Infrastructure. Practical outputs include managerial implications for universities: strategic integration of VE networks into brand governance and international visibility strategies; minimum standards of public presence (logo sets, reciprocal links, banners, preservation of PDFs/screenshots); and post-project artifact maintenance (institutional repositories, event/course catalogs, URL sustainment).

The central question addresses how VE transforms university brand governance practices in a digital, internationally networked environment. The thesis is that VE networks such as VEHUB4YOU generate an infrastructure of co-branding and distributed legitimation: recurring co-visualization of partner logos in educational videos and events, reciprocal links across partner sites, co-branded certificates, and locally operated hubs jointly produce governable mechanisms for recognition, trust, and international positioning (Iglesias et al., 2020; Ind et al., 2013). The practical significance lies in specifying governance mechanisms for brand management through VE - associative positioning, multichannel replication of identity, social proof via certification and event media, network propagation through hubs, and embedded cues of legitimacy (e.g., EU co-funded statements, presence on official portals).

Contemporary literature conceptualizes the university brand as a multidimensional construct emerging from the interplay between awareness, perceived quality, trust, associations, and loyalty (Hemsley-Brown & Oplatka, 2022; Pinar, Trapp, Girard, & Boyt, 2014). These dimensions are co-produced through cumulative digital interactions rather than static representations. In the digital era, the brand capital of a university is continuously enacted through its online ecosystems, ranging from the user experience (UX) design of institutional websites to its presence across social

media, online learning platforms, and MOOC environments (Chapleo & O'Sullivan, 2017; O'Sullivan, Polkinghorne, Chapleo, & Cownie, 2024).

The digital ecosystem creates new signaling channels of quality and credibility (Foroudi, Melewar, & Gupta, 2017). Within these channels, elements such as interface coherence, co-branding visual templates, and the logo co-presence of partner institutions function as cognitive cues of affiliation, legitimacy, and academic reliability. In this respect, digital visibility transforms into a form of epistemic infrastructure, - a traceable condition of institutional credibility (Iglesias, Markovic, & Ind, 2020).

The theory of brand co-creation, articulated since the early 2010s, emphasizes that the meaning of a brand arises within interactions between an organization and its stakeholders (Hatch & Schultz, 2010; Ind, Iglesias, & Schultz, 2013). Management of the brand therefore entails management of the conditions of interaction rather than control over one-way communication. For universities, this implies that brand value also materializes within shared international projects, in which students, facilitators, partner institutions, and online audiences act as co-authors of brand meaning. The result is a participatory logic of shared brand governance, grounded in transparency, dialogical interaction, and distributed ownership of reputation (Hatch & Schultz, 2010; Iglesias et al., 2020).

Empirical research on Virtual Exchange (VE) demonstrates its capacity to generate not only educational and intercultural outcomes, such as global citizenship and civic engagement, but also reputational and legitimacy effects for participating institutions (Helm, 2018; European Commission, 2020). Participation in an internationally co-funded VE consortium signals credibility, inclusion, and alignment with European higher education values. From a branding perspective, such participation provides legitimacy cues: EU co-funding statements, institutional listing in public Erasmus+ databases, and consistent representation in multilingual media ecosystems (Erasmus+ National Office in Ukraine, 2024; VEHUB4YOU, n.d.).

In the case of VEHUB4YOU, the official portal, partner web pages, and social media collectively document visible and verifiable practices of institutional presence.

Sections such as Partners, event reports, and visual archives of trainings and workshops establish a traceable pattern of networked visibility. This traceability strengthens third-party trust, - among prospective students, employers, and donors, since verifiable evidence of collaboration circulates beyond the university's proprietary channels.

A distinctive feature of VE ecosystems is their co-branding architecture, wherein partner logos are jointly displayed across all media: video courses, event banners, presentation slides, certificates, and social posts. This configuration activates the mechanism of associative transfer as a process by which the perceived quality and legitimacy of one institution influence the others through visual proximity and repetition (Foroudi et al., 2017; Iglesias et al., 2020).

Recent studies confirm that students' value co-creation behavior (participation, initiative, and public digital engagement) positively affects a university's brand image and reputation (Nguyen, Yu, Melewar, & Chen, 2021). Such engagement includes interactions with institutional web content, reposting of official materials, and public sharing of certificates and digital badges. In VEHUB4YOU, the network of sixty virtual business hubs (forty in Ukraine and twenty in Azerbaijan) acts as a multiplier of digital trace: each local node publishes project-related content, reproduces co-branded identity, and amplifies the density of digital references to partner universities (VEHUB4YOU, n.d.).

Synchronous VE activities, such as online panels, training sessions, workshops, and international conferences, - create a recurrent rhythm of brand exposure. Each event reproduces the network identity across presentations, slides, streaming frames, and social media posts. Documentation from the Erasmus+ National Office in Ukraine (2024) and institutional news from KNUTD (2025) confirm the continuity of these formats during 2023–2025.

Participant and facilitator certificates, displaying the joint logos of all partners, function as personalized brand carriers: they circulate through social networks and professional portfolios, generating long-term digital artifacts that reinforce associations with the international network (Helm, 2018). This mechanism aligns with the concept of the responsible corporate brand, wherein stakeholders act as custodians and

disseminators of brand values (Iglesias & Ind, 2016). Thus, VE transforms branding from a top-down communication practice into a distributed display of credibility, where every co-branded artifact serves as a trace of institutional legitimacy.

Within the logic of co-creation, the role of the university in VE brand governance shifts from control to moderation of interactions. Effective governance entails establishing clear standards for visual consistency (equal logo prominence, symmetry in layouts), maintaining reciprocal links among partner websites, ensuring hub activity, encouraging student-generated content, and integrating event cycles into formal learning structures (Iglesias et al., 2020).

This governance of interactions creates structured contact points between the brand and its audiences - contact points that, according to empirical evidence, correlate with improvements in perceived institutional image and reputation (Nguyen et al., 2021; Chapleo & O'Sullivan, 2017). In the VEHUB4YOU ecosystem, these points are visible through its central website, partner catalogs, and official social media accounts (Instagram, YouTube), as well as through localized institutional pages (e.g., RISEBA University of Applied Sciences; KNUTD) and official news releases from Erasmus+ National Office in Ukraine (2024).

Building on the foregoing literature, Table 7.3 consolidates the author's novelty into five contribution blocks - conceptual, theoretical, methodological, empirical, and practical, which are later operationalized in methodology and visualized in Figure 7.2.

As shown in Table 7.3, the conceptual categories (Virtual Brand Hub, Brand Visibility Infrastructure, Digital Reputation Capsule) align with the Brand as Infrastructure thesis and are evidenced empirically through five network mechanisms.

Drawing on recent work in university branding and co-creation (Hemsley-Brown & Oplatka, 2022; O'Sullivan et al., 2024; Ind, Iglesias, & Schultz, 2013; Iglesias, Markovic, & Ind, 2020), the study distills its original contribution into a structured matrix spanning five blocks (Table 7.3).

Table 7.3. Matrix of the Author's Novelty and Contributions to University Brand Governance in Digital Environments: New Concepts, Theoretical Generalizations, Methodological Inputs, Empirical Governance Mechanisms, and Practical Implications on the base of VEHUB4YOU Case

Block	Element	Concise formulation (for the figure/schema)
1. New concepts (conceptual contribution)	Virtual Brand Hub	A local unit within the VE network that reproduces the shared identity, generates verified digital traces (news, pages, certificates, videos), and ensures cross-border visibility of the university brand.
	Brand Visibility Infrastructure	A set of technical and organizational mechanisms (standardized logo compositions, hyperlinks, partner pages, event cycles) that secure the repeatability and verifiability of the brand's digital representation.
	Digital Reputation Capsule	An accumulated, verifiable bundle of online artifacts (URLs, PDFs, videos) that documents participation in international initiatives and serves as a durable source of trust for external audiences.
2. Theoretical generalization	Brand as Infrastructure	A shift from communication-centered branding to institutional–network governance of visibility (*shared brand governance*).
	Networked Co-Branding Model	Harmonized visual and hyperlink practices as mechanisms of mutual reinforcement of partner identities in VE projects.
3. Methodological contribution	Table 7.2 as a reproducible corpus	>70 verified pages with metadata (country, institution/hub, source type, title, date, URL, APA citation) - operationalizing visibility as a research variable.
	Visual brand-audit	A combination of content analysis, logo-matrix auditing, and hyperlink tracing as procedures to verify co-branded presence.
4. Empirical mechanisms of brand governance	Associative positioning	Repeated co-presence of logos → transfer of associations across brands.
	Network diffusion	Hubs as multipliers of digital footprint; cross-links to the central portal.
	Semiotic stabilization	Standardized layouts and color schemes reduce recognition costs.
	Documentary verification	Certificates and official pages function as citable evidence for external audiences.
	Hyperlink stitching	Bidirectional university ↔ project links demonstrate network integrity.
5. Practical implications for universities	Strategic integration of VE networks	Embedding VE into brand-governance and international visibility strategies.
	Minimum standards of public presence	Logo sets, reciprocal links, banners, and preservation of PDFs/screenshots as part of a quality policy.
	Post-project artifact maintenance	Repositories and event/course catalogs as the continuation of the reputation capsule.

Sourse: Author's elaboration based on the VEHUB4YOU case and the verified dataset Table 7.2.

Networked co-branding is not an automatic synonym for individual brand gain. Potential risks include dilution of institutional identity amid visual saturation, asymmetry in partners' communication capacities, and cognitive inertia where audiences remember the project name rather than specific universities (Foroudi et al., 2017). Effective brand governance within VE therefore requires policies of parity visualization, post-project artifact preservation (video repositories, open courses, certificate archives), and systematic monitoring of digital mentions and visibility metrics.

These practices correspond to broader EU project management frameworks emphasizing the Dissemination, Exploitation, and Communication (DEC) principles, which mandate planned outreach, sustainability of results, and transparent public visibility (European Commission, 2020). Sustained governance beyond the project lifecycle is essential for preserving what this study terms the Digital Reputation Capsule - a durable repository of verified brand traces and institutional trust.

The study adopts a qualitative, analytic case-study design focused on reconstructing the mechanisms of university brand governance within the international virtual exchange environment of VEHUB4YOU.

The brand is treated as an outcome of interactions in distributed networks coordinated by digital platforms, rather than as an isolated organizational asset.

This institutional–network perspective follows research on networked forms of organizing and innovation as well as contemporary work on brand co-creation and shared governance, where meaning emerges through stakeholder interaction and managerial work consists in moderating conditions of interaction and visibility (Powell & Grodal, 2021; Hatch & Schultz, 2010; Iglesias, Markovic, & Ind, 2020). Accordingly, VEHUB4YOU is examined as an infrastructure of brand interaction that integrates both digital artefacts and participatory practices, that is, (1) material artefacts such as websites, logo matrices, certificates, and instructional videos, and (2) actor-mediated practices including facilitation, co-design sessions, student participation, and university-led communication routines shaping the project's online visibility. This dual framing allows the identification of not only the existence of digital presence but also

of the governable mechanisms through which such presence is continuously produced, verified, and reinforced across the network.

In addition, the study draws on the researcher's direct participation as a coordinating member responsible for aspects of the project's digital presence, - website and social-media workflows, visual identity implementation, and logo governance, which provides situated insight into how visibility is produced, verified, and maintained across the network.

The empirical corpus draws on publicly accessible, official digital sources sampled across five channels to ensure verifiability and triangulation. First, the central VEHUB4YOU website functions as a coordinating core, aggregating partner profiles, events, learning activities, and hubs. Second, institutional pages of partner universities, such as RISEBA University of Applied Sciences, the University of Foggia, and Kyiv National University of Technologies and Design, confirm participation and provide bidirectional links to the project portal. Third, verified social media accounts document event dynamics and reproduce co-branded identity across platforms. Fourth, official news posts of the Erasmus+ system and the National Erasmus+ Office in Ukraine record conferences, trainings, and dissemination activities. Fifth, instructional video materials and co-branded certificates serve as durable digital artifacts that circulate in portfolios and social feeds. Inclusion required explicit reference to VEHUB4YOU and/or visible co-branded visualization, affiliation to an official project or institutional channel, and an active publicly accessible URL at the time of verification, with sufficient information to permit independent cross-checking. These criteria are aligned with European Commission guidance on Dissemination, Exploitation, and Communication, which emphasizes transparency, reproducibility, and sustainability of publicly communicated results (European Commission, 2020; European Commission, 2021).

A visual brand-audit protocol structures the analysis and integrates three complementary procedures. Content analysis identifies the frequency and context of brand mentions, the mix of source types (web page, PDF, video, social post), and the use of standardized acknowledgments such as EU co-funded statements and partner

lists. Semiotic inspection evaluates the design grammar of logo compositions, including order and symmetry, template stability, and color schemes, as indicators of identity coherence. Hyperlink tracing maps reciprocal navigation paths between institutional pages and the central portal, capturing the degree to which the network exposes itself to third-party verification. The protocol draws on critical visual analysis and the literature on brand identity coherence and co-creation, with the emphasis placed on verifiable traces, standardized evidence capture, and cross-link mapping (Schroeder, 2024; Hemsley-Brown & Oplatka, 2022; O'Sullivan, Polkinghorne, Chapleo, & Cownie, 2024; Iglesias et al., 2020).

Evidence was assembled into Table 7.2, a verified dataset of seventy-two unique entries covering four national contexts - Ukraine, Azerbaijan, Italy, and Latvia, - and the central project ecosystem. Each record contains country, institution or hub, source type, page or material title, a brief description of brand visualization, publication or update date, an active link, an APA-formatted citation, and notes on visual evidence when applicable. Verification included date-stamped manual checks of URL accessibility and archiving of PDF captures or screenshots to support reproducibility. Both static artifacts (institutional pages, project pages, PDF documents) and dynamic artifacts (social posts, videos, live streams) were included to reflect the breadth of digital presence. The dataset operationalizes visibility as a research variable by encoding co-branding intensity, hyperlink connectivity, media type, and temporal stability, thus providing a basis for comparative inspection of network coherence and the persistence of co-branded identity (European Commission, 2020; European Commission, 2021).

The analysis proceeds as a continuous sequence rather than discrete stages, moving from the identification of sources to the interpretation of patterns and their alignment with theory. Regular co-display of partner logos on banners, splash screens, certificates, and official pages is read as associative positioning: a mechanism through which reputational attributes are transferred among universities by means of repeated visual proximity. The multiplication of local hubs and mirrored institutional pages is interpreted as network diffusion, wherein each node becomes an entry point that replicates identity standards and expands the digital footprint. Standardized layouts and

color schemes sustain semiotic stabilization by reducing recognition costs and preserving identity coherence across channels. Certificates and official pages act as documentary verification, forming a citable evidence base for external audiences. Bidirectional links between institutional and project sites create hyperlink stitching, which facilitates traversal and supports independent checks. Observed across Table 7.2 and official communications, these processes are consistent with the shift from centralized control to moderation of interactions in brand governance (Hatch & Schultz, 2010; Iglesias et al., 2020; Hemsley-Brown & Oplatka, 2022; O'Sullivan et al., 2024; National Erasmus+ Office in Ukraine, 2023; Kyiv National University of Technologies and Design, 2025; RISEBA University of Applied Sciences, n.d.; University of Foggia, n.d.; VEHUB4YOU, n.d.).

The same protocol reveals that VEHUB4YOU functions as a robust infrastructure of digital visibility under DEC norms. Because the dataset is assembled from official channels and is accompanied by archived captures, its entries can be rechecked independently, which stabilizes claims regarding brand co-presence and partner participation. This transparency is material to the project's legitimacy claims and to the managerial reading of the case: VE-based branding is less a matter of one-way messaging than the establishment of conditions that enable recognition, cross-verification, and durable traceability across the network. This logic converges with the literature that repositions the university brand as an institutional infrastructure built through repeated interactions across stakeholders and platforms (Hemsley-Brown & Oplatka, 2022; O'Sullivan et al., 2024).

Limitations pertain to the absence of audience-level measurement of awareness or association transfer, uneven updating of channels across partners, variation in local hub practice, and the limited retrospection of certain social-media sources. These constraints do not compromise the reconstruction of structural mechanisms because the object of analysis is the presence of verifiable traces and their patterned repetition rather than attitudinal outcomes. Future work may layer survey or experimental designs onto the present corpus, but the current approach is appropriate to the inquiry into governance mechanisms and network conditions.

The methodological synthesis aligns directly with the study's three-tier contribution model. The first tier consists of methods as inputs, namely the Table 7.2 verified co-branding dataset and the visual brand-audit protocol. The second tier is the set of empirical mechanisms identified in the corpus, - associative positioning, network diffusion, semiotic stabilization, documentary verification, and hyperlink stitching, which together describe how networked co-branding operates in practice. The third tier delivers conceptual and practical outputs: the categories of Virtual Brand Hub, Brand Visibility Infrastructure, and Digital Reputation Capsule; the theoretical formulation of brand as infrastructure; and actionable implications for university managers, including strategic integration of VE into brand governance and international visibility strategies, minimum standards for public presence, and post-project maintenance of digital artifacts in institutional repositories and event or course catalogues (European Commission, 2020; European Commission, 2021; Iglesias et al., 2020).

Overall, the methodology provides a reproducible, evidence-based path from verifiable digital traces to theoretically framed mechanisms and managerial implications. It enables readers to audit the chain of inference from artifact to interpretation and to situate VEHUB4YOU within a broader conversation about brand governance in higher education that privileges transparency, networked verification, and durable visibility.

Results. The reconstruction of VEHUB4YOU's digital footprint reveals a layered socio-technical architecture of visibility in which institutional brands are enacted through repeatable templates, cross-links, and verifiable artefacts distributed across partner ecosystems. Reading the case through the lens of brand co-creation and shared governance clarifies that visibility is not a by-product of communication campaigns but the outcome of governed interactions among stakeholders and platforms (Hatch & Schultz, 2010; Iglesias, Markovic, & Ind, 2020). In practical terms, the network's presence coheres around a central portal that aggregates partner profiles, learning activities, and event streams; a set of institutional mirror pages hosted by universities in Ukraine, Azerbaijan, Italy, and Latvia; multimedia channels that reproduce standardised logo matrices and colourways; and a series of locally run hubs that

multiply entry points into the shared identity. Such an arrangement corresponds to contemporary understandings of university branding as a system of interlinked digital touchpoints whose consistency and auditability are decisive for the accumulation of brand equity (Hemsley-Brown & Oplatka, 2022; O'Sullivan, Polkinghorne, Chapleo, & Cownie, 2024).

Triangulation with the verified Table 7.3 corpus substantiates the networked character of this architecture. The dataset comprises seventy-two entries across four national contexts and the central project layer, each documented with metadata (country, institution/hub, source type, title, publication/update date), screenshots or PDF captures, and an APA citation. Verification conducted between 10 and 18 October 2025 confirms that the great majority of entries contain both textual references to the project and visible co-branding (for example, partner grids on project and university pages, standardised banner compositions, and branded video intros), enabling independent cross-checks and reducing reliance on self-reported claims. These practices align with European Commission guidance on dissemination, exploitation, and communication (DEC), which places weight on traceability, public accessibility, and reproducibility of outputs (European Commission, 2020; European Commission, 2021).

7.3.1. Architecture of digital presence

The case reconstructs a structured footprint of vehicle pages, media assets, and navigational ties across the VEHUB4YOU network. The footprint comprises four interlocking components. First is the central portal that aggregates partners, events, training materials, and news. Second is a layer of institutional mirror pages on university websites that restate project aims and provide direct links to the portal. Third is a multimedia layer that includes course videos, branded slides, and certificates. Fourth is a social-media layer that republishes event banners and short video formats, with links back to institutional and project pages. These components form a system of interlinked touchpoints in which visibility depends on consistency and auditability rather than isolated announcements. This reading is consistent with research that treats university brand equity as the cumulative effect of repeated, coherent touchpoints and

verifiable cues (Hemsley-Brown & Oplatka, 2022; O'Sullivan, Polkinghorne, Chapleo, & Cownie, 2024). The mix aligns with brand co-creation research, where brand meaning is enacted in interactions among stakeholders and infrastructures rather than through one-way messaging (Hatch & Schultz, 2010; Iglesias, Markovic, & Ind, 2020). The audit shows that templates are reused across channels and periods. Logo matrices, colourways, and banner frames recur. Cross-links connect university pages to the portal and the portal back to university pages. These patterns indicate the presence of governed routines rather than ad hoc publicity. In sum, the network's architecture operates as a reproducible visibility system grounded in standardisation, cross-link density, and artefact preservation.

7.3.2. Cross-national co-branding structure

The network spans four national contexts - Ukraine, Azerbaijan, Italy, and Latvia - plus the central project layer. Across contexts, the same visual grammar appears: complete partner logo sets; EU and Erasmus+ marks; and short descriptive copy that situates each node within the consortium. This yields a multi-brand arrangement where institutional identities are presented together at equal status. Co-branding studies report similar arrangements in higher education, but often at the level of bilateral partnerships or events. The present case extends the pattern to a cross-national, multi-node configuration in which the template is replicated at scale (Curtis, Abratt, & Minor, 2009; Hemsley-Brown & Oplatka, 2022). The replication implies a distinct organisational unit. The unit is the Virtual Brand Hub. It is a localised node, often a university page or a hub microsite, that reproduces the shared identity, links to the portal, and publishes local content in line with the consortium template. The hub functions as a multiplier of entry points. It also provides a site where local activities, - workshops, debates, simulations, are documented and co-branded. This structure supports distributed brand governance by shifting emphasis from central announcements to local enactment and mirroring. The arrangement fits theory that positions brands as networked systems rather than unitary corporate signals (Ind, Iglesias, & Schultz, 2013; O'Sullivan et al., 2024).

7.3.3. Digital verification and metadata

The Table 7.2 dataset consolidates the digital trace into a reproducible corpus. The corpus contains seventy-two entries created from official channels. Each entry includes country, institution or hub, source type, title, publication or update date, and notes on brand visualisation. Each entry is supported by screenshots or PDF captures for independent checking. The dataset encodes three features that are central to brand verification. The first is co-branding intensity: presence of the complete partner matrix or equivalent formal acknowledgement. The second is hyperlink stitching: bidirectional links between portal and institution. The third is template stability: reuse of the same logo order, colourway, and framing across time and channels.

The corpus follows European Commission guidance on dissemination, exploitation, and communication. The guidance stresses transparency of outputs, public accessibility, and traceability that permits reuse and audit (European Commission, 2020; European Commission, 2021). The dataset translates these norms into research operations. It specifies inclusion criteria, documents update dates, and preserves artefacts. As a result, the corpus functions both as evidence and as a replication layer. It also enables cross-sectional comparisons. Entries can be grouped by country, source type, or artefact class and then inspected for stitching, intensity, and stability. This operationalisation matches research on visual identity and critical visual analysis that treats brand evidence as a pattern of repeatable signs and link structures (Schroeder, 2024; Iglesias et al., 2020).

7.3.4. Institutional visuality and reciprocal positioning

Co-presence of institutional logos on banners, slides, and certificates generates associative positioning. The effect arises from repeated proximity and template repetition. Audiences encounter the same constellation of brands across news, training pages, and video intros. Studies on logo systems and brand meaning suggest that such repetition supports recognition and perceived quality transfer within alliances, particularly where parity and order are stable (Foroudi, Melewar, & Gupta, 2017). In the corpus, parity appears in the balanced layout of partner grids. Order is consistent across most entries. EU and Erasmus+ marks are present. Textual references to the

consortium are explicit. Reciprocal positioning is also navigational. Cross-links allow traversal from local institutional pages to the project portal and back. This two-way stitching creates an audit path for third parties. The path reduces ambiguity about participation status and allows verification without recourse to internal records. The path also aggregates traffic around shared artefacts (news indices, event pages, and training series), that are configured to display the full partner set. Over time, the accumulation of pages, captures, and links forms a Digital Reputation Capsule. The capsule is a bundle of citable artefacts that extends beyond the lifespan of individual events. It is preserved in repositories, news archives, and video channels. It is also portable to external assessments, grant reviews, and partner due diligence. This mechanism is aligned with branding research that links documentary evidence to perceived legitimacy in higher education (Hemsley-Brown & Oplatka, 2022).

7.3.5. Interpretive synthesis: virtual exchange as brand infrastructure

The results substantiate a shift from communication campaigns to infrastructure. The shift is theoretical and empirical. Theoretically, brand co-creation research argues that meaning arises in interaction among stakeholders and that governance consists in moderating the conditions of interaction (Hatch & Schultz, 2010; Ind et al., 2013). Empirically, the case shows that conditions, such as templates, links, artefacts, and routines, are present and governable. Templates enforce parity and recognisability. Cross-links enable verification. Artefact preservation ensures continuity. Routines assign responsibility for updates and replication. In combination, these conditions constitute a Brand Visibility Infrastructure.

Five mechanisms describe how the infrastructure operates. First, associative positioning is visible in the repeated co-display of partner logos across multiple media, - banners, conference slides, course thumbnails, and certificates (Figures 7.3-7.5), - creating durable cross-brand associations through visual proximity and frequency. Research on logo semiotics and brand meaning transfer suggests that such stable logo constellations function as cognitive cues of affiliation and perceived quality, especially where templates are consistent across channels (Foroudi, Melewar, & Gupta, 2017; Iglesias et al., 2020). In VEHUB4YOU, this is not incidental ornamentation but a

governed routine: the same matrix of partners recurs in institutional news items, portal pages, and audiovisual assets recorded in Table 7.2, producing a recognisable signature of the network.

Second, network diffusion follows from the multiplication of local hubs and mirror pages, each of which acts as an ingress to the shared identity. In Ukraine and Azerbaijan alone, sixty virtual hubs extend the surface area of the brand by replicating layouts and cross-linking to the central portal; Italian and Latvian institutional pages mirror these standards, sustaining cohesion across jurisdictions. In brand governance terms, hubs operate as capacity-building nodes that translate a central identity grammar into localised content without fracturing the system - an approach congruent with the movement from centralised control to moderated visibility conditions in co-creative branding (Ind, Iglesias, & Schultz, 2013; Hemsley-Brown & Oplatka, 2022).

Fig. 7.3. University project page VEHUB4YOU - Virtual Youth Business Hubs International Network (Erasmus+ Project) with the direct hyperlink to the official project portal

Source: Authors screenshot from (RISEBA University of Applied Sciences. (n.d.)

Third, semiotic stabilization is achieved through standardised compositions (order and parity of logos), palette discipline, and recurrent framing devices in video and event media. Repetition of these low-level visual rules reduces recognition costs for audiences and assists category placement, a point highlighted in critical visual analysis of branding and in higher-education brand research that links design grammar to recognisability and trust (Schroeder, 2024; O'Sullivan et al., 2024). In the corpus, stability is evident longitudinally: the same template families appear across 2023–2025 entries, including conference banners, course series, and institutional news.

Fourth, documentary verification consolidates legitimacy claims through co-branded certificates, official institutional notices, and project pages that serve as citable artefacts for third parties. Certificates awarded to facilitators and student participants display the full partner set and Erasmus+ marks, circulating in portfolios and social feeds and extending the lifetime of the brand trace. In the organisation studies literature, such artefacts are not merely symbolic; they are tokens of accountability that travel across audiences and platforms, making reputational claims auditable ex post (Hemsley-Brown & Oplatka, 2022). The Table 7.2 entries include multiple certificate exemplars and institutional notices that collectively demonstrate this mechanism.

Fig. 7.4. Promotional banner of the Erasmus+ VEHUB4YOU project

Source: Authors screenshot from (University of Foggia, 2023)

CERTIFICATE
OF ACHIEVEMENT

This certificate is awarded to
Tetiana Yavorska

for the successful completion of the
Professional Qualification Enhancement Program
"Use of Information and Communication Technologies in the Educational Process"
Implemented within the framework of the
Erasmus+ Project ERASMUS EDU-2021-VIRT EXCH NDICI
VIRTUAL YOUTH BUSINESS HUBS INTERNATIONAL NETWORK (**VEHUB4YOU**),
from March to September 2024, comprising 180 hours of training (6 ECTS credits).

Contents of the Programme:

MODULE 1. Research of innovations in the European educational process on the basis of the University of Foggia, Italy (1 credit, 30 hours)
MODULE 2. Study of innovations in the European educational process at the University of RISEBA, Latvia (1 credit, 30 hours)
MODULE 3. Implementation of international practices Ukraine (1 credit, 30 hours)
MODULE 4. Implementation of international practices Azerbaijan (1 credit, 30 hours)
MODULE 5. Preparing a project for international virtual exchanges (1 credit, 30 hours)
MODULE 6. Presentation of implemented virtual exchanges (1 credit, 30 hours)

Giulio Esposito
HEAD OF INTERNATIONAL RELATIONS OFFICE UNIFG

Lūcija Rutka
PROF., DR. PSYCH., RECTOR
RISEBA UNIVERSITY

VEHUB4YOU · RISEBA · Co-funded by the European Union

Fig. 7.5. Certificate of Achievement - Professional Qualification Enhancement Program Use of ICT in the Educational Process (VEHUB4YOU)

Source: Authors screenshot from (Tavriya State Agrotechnological University, 2024).

Fifth, hyperlink stitching - the presence of bidirectional links between institutional pages and the project portal - creates traversable paths that enable independent verification by external audiences and crawlers. Cross-link density is a governance variable in its own right: where it is high, the network's boundaries are easier to inspect and the risk of orphaned claims declines. Mapping in the audit shows that partner pages typically link inward to the portal while the portal lists or profiles partners with outward links, reproducing this stitching pattern in line with DEC expectations (European Commission, 2020; European Commission, 2021).

Interpreted together, these five processes instantiate the theoretical proposition that brand functions as infrastructure - a set of socio-technical conditions that allow identity to be reliably reproduced and verified across space, media, and time (Hatch & Schultz, 2010; Iglesias et al., 2020). The case indicates that the infrastructure is governable: templates can be enforced, cross-links can be provisioned, artefacts can be archived, and participation routines can be moderated by project and institutional teams. This reading extends the university branding literature in two ways. Empirically, it demonstrates that a cross-institutional VE network can operate as a visibility infrastructure rather than a marketing channel, with the measurable outputs being verifiable artefacts and navigable link structures rather than impressions or reach alone (Hemsley-Brown & Oplatka, 2022; O'Sullivan et al., 2024).

Conceptually, it clarifies three categories - Virtual Brand Hub, Brand Visibility Infrastructure, and Digital Reputation Capsule - that describe, respectively, the local organisational node that reproduces shared identity, the ensemble of rules and devices that secure repeatability and verifiability, and the accumulated bundle of citable artefacts that stabilise trust over time.

The dataset also illuminates cross-national consistencies and bounded variation. Consistency is highest where partner pages closely mirror portal templates and where events are documented through standardised banners and news formats. Variation arises in update cadence and depth of local reporting, reflecting differences in communication capacity and editorial practice across institutions - an asymmetry acknowledged in the limitations and well documented in the branding literature on networked collaborations (Ind et al., 2013; O'Sullivan et al., 2024). Yet, the stitching effect persists: even where local content is sparser, inward and outward links typically remain active, preserving traversability and evidence chains.

Finally, the results sharpen the managerial reading. If visibility is infrastructural, the task of brand governance in VE becomes the moderation of conditions under which identity is enacted: parity rules for logo placement, minimum standards for cross-linking, routines for archiving and citation, and protocols for hub activity and event documentation. Table 7.2 demonstrates that these conditions can be codified and

monitored; the visual audit shows they can be assessed consistently; and the observed mechanisms indicate that they yield cumulative benefits in recognition, legitimacy, and international positioning. In this sense, VEHUB4YOU illustrates how a VE consortium can shift university branding from campaign-centric communication to governed, auditable visibility, consistent with European norms for dissemination and exploitation and with contemporary theory on co-creative brand governance (European Commission, 2020, 2021; Hatch & Schultz, 2010; Iglesias et al., 2020; Hemsley-Brown & Oplatka, 2022).

Associative positioning results from repeated co-display of brands across artefacts. Network diffusion arises as hubs replicate identity and multiply entry points. Semiotic stabilization follows from consistent layouts and colourways that reduce recognition costs. Documentary verification is delivered through certificates and official notices that can be cited. Hyperlink stitching creates traversable and auditable paths between nodes. These mechanisms are observable across countries and media classes in the dataset. They also match the theoretical prediction that, under co-created governance, identity emerges from repeatable practices embedded in socio-technical systems (Iglesias et al., 2020; O'Sullivan et al., 2024).

The implications are direct. If visibility is infrastructural, brand management in VE becomes the moderation of conditions rather than the orchestration of single campaigns. Institutions should codify template rules and parity. They should maintain bidirectional links and monitor stitching coefficients. They should preserve artefacts in repositories with dates and identifiers. They should support hub activity with minimal content standards and regular update cycles. These prescriptions align with DEC norms and with university branding research that emphasises governance and verification over slogans (European Commission, 2020; Hemsley-Brown & Oplatka, 2022).

The results also clarify scope and limits. Update cadence differs across institutions. Local editorial depth varies. Social media introduces ephemerality. The audit mitigates these factors by relying on preserved artefacts and cross-link checks. The corpus does not measure audience-level awareness or association transfer. These remain tasks for future studies that can add surveys or quasi-experiments. The present

objective was to reconstruct mechanisms. The dataset and protocol satisfy that objective by providing verifiable, replicable evidence of the infrastructure at work.

7.3.6. Discussion and Implications

The analytical reconstruction of the VEHUB4YOU case demonstrates that digital brand management in higher education has shifted from an institutional communication activity to a distributed infrastructural process. This discussion consolidates the empirical mechanisms identified in Section 4 into conceptual and practical contributions. It addresses three interrelated dimensions: (1) theoretical reframing of university branding as infrastructural governance; (2) methodological advances in the verification of digital presence; and (3) strategic implications for universities participating in virtual exchange networks.

The empirical findings extend the theoretical argument of brand co-creation into the domain of governance. Prior literature interpreted co-creation mainly as dialogic exchange or stakeholder interaction (Hatch & Schultz, 2010; Ind, Iglesias, & Schultz, 2013). The VEHUB4YOU case suggests that the coordination of brand meaning also requires an infrastructural substrate, that stabilises these interactions over time. This observation is consistent with the emerging view of branding as a socio-technical infrastructure, in which governance consists of moderating technical standards and maintaining transparency rather than enforcing central control (Iglesias, Markovic, & Ind, 2020; Schroeder, 2024).

Within this framing, the university brand is no longer a communicative symbol but an operational system of managed visibility. Such a system depends on repeatable visual grammars, reciprocal links, and traceable artefacts. The three conceptual categories proposed - Virtual Brand Hub, Brand Visibility Infrastructure, and Digital Reputation Capsule, - capture different scales of this system. The Virtual Brand Hub operates at the local node level, translating the consortium identity into a university's own context. The Brand Visibility Infrastructure represents the cross-node architecture that ensures standardisation and parity. The Digital Reputation Capsule refers to the long-term preservation of verified artefacts, forming a reference layer for future

evaluations or partnerships. Together, these categories explain how institutional legitimacy is generated and maintained within distributed, multi-brand constellations.

The Table 7.2 dataset and visual audit protocol introduce a replicable methodological contribution. Traditional studies of university branding rely on interviews, surveys, or textual analysis of official statements (Hemsley-Brown & Oplatka, 2022). The present approach complements these methods by operationalising visibility as a measurable variable. Each entry in Table 7.3 encodes metadata (country, institution, source type, date, and link integrity), allowing cross-case comparison and longitudinal tracking.

This design enables a form of digital brand verification analogous to content auditing in corporate communication (Foroudi, Melewar, & Gupta, 2017). It translates qualitative impressions of presence into structured, reproducible evidence. The method also reveals governance asymmetries: differences in update frequency, hyperlink reciprocity, and visual parity can be identified empirically rather than inferred from interviews. In this sense, the dataset serves as both an empirical base and a diagnostic instrument. It can be adapted for other transnational educational networks, Horizon Europe consortia, or Erasmus+ partnerships.

Moreover, the visual audit protocol advances the operationalisation of brand co-creation by linking artefact repetition to semiotic stability. Repetition is not treated as duplication but as an indicator of governance performance. The more consistently templates and logos recur, the more stable the infrastructural identity appears. This approach aligns with recent methodological debates on the role of trace-based evidence and digital audit trails in organisational research (O'Sullivan, Polkinghorne, Chapleo, & Cownie, 2024).

The findings have direct managerial significance. Universities increasingly participate in multi-brand environments where their identity coexists with EU, national, and partner logos. Under such conditions, strategic communication alone cannot guarantee recognition; instead, institutions must manage governance conditions of visibility. Four strategic implications follow.

First, institutions should integrate virtual exchange networks into their brand governance policies. Participation should be recognised as a legitimate source of brand equity and institutional reputation. This requires formal inclusion of VE indicators - number of verified artefacts, cross-links, and partner mentions, - into marketing and quality assurance frameworks (European Commission, 2020).

Second, parity and consistency in visual representation should be codified as minimal participation standards. Shared templates, equal logo order, and maintained bidirectional links prevent asymmetries and ensure equitable visibility among partners. Such codification reflects the principle of shared brand governance described in the co-creation literature (Ind et al., 2013).

Third, universities should preserve the outputs of virtual exchange beyond project cycles. Certificates, videos, and training pages should be archived in institutional repositories to sustain the Digital Reputation Capsule. Long-term preservation transforms temporary visibility into a durable legitimacy asset, providing evidence for audits, funding applications, and public communication (Hemsley-Brown & Oplatka, 2022).

Fourth, monitoring mechanisms should be established to measure infrastructural integrity. Regular audits of hyperlinks, metadata completeness, and template adherence can act as early indicators of governance performance. These procedures correspond to the European Commission's emphasis on open, verifiable dissemination and result exploitation (European Commission, 2021).

The study contributes to the theoretical discussion on brand governance in higher education by positioning virtual exchange not as a communication channel but as a semantic infrastructure of legitimacy. This perspective connects branding theory with infrastructural and organisational studies that view digital environments as regimes of coordination (Schroeder, 2024). By tracing brand operations through artefacts, links, and routines, the study bridges interpretive and technical dimensions of branding.

Nonetheless, limitations remain. The corpus focuses on visible outputs and does not assess audience perception or associative transfer. The audit records presence, not sentiment. Future studies could integrate survey data or digital ethnography to examine

how audiences interpret the brand constellations reconstructed here. Comparative research across different Erasmus+ or Horizon Europe networks could test whether the same infrastructural mechanisms apply in diverse governance settings.

By embedding these categories within European policy frameworks and empirical evidence, the study contributes to a growing body of work that reframes university reputation as a function of governed visibility rather than promotional discourse (Iglesias et al., 2020; O'Sullivan et al., 2024). In doing so, it redefines the university's role in the digital era: not merely as a communicator of values but as a maintainer of the socio-technical infrastructures through which those values become visible, credible, and verifiable.

CONCLUSION

The collective monograph Economic Behavior and the Formation of Business Thinking among Young People in International Virtual Exchanges: Best Practices in Online Education offers a comprehensive and multi-dimensional understanding of how virtual exchange ecosystems transform the nature of economic education, entrepreneurial behavior, and digital learning in contemporary higher education.

Through seven interrelated chapters, the study traces the conceptual evolution, theoretical justification, and institutional implementation of the VEHUB4YOU project (Erasmus+ ERASMUS-EDU-2021-VIRT-EXCH). The project demonstrates that international virtual exchanges - when designed as virtual business hubs - can effectively nurture youth entrepreneurial competence, reinforce cross-cultural dialogue, and create sustainable forms of global learning mobility.

The evidence collected from participating institutions in Ukraine, Italy, Azerbaijan, and Switzerland confirms that virtual hubs can function as learning infrastructures, not merely technological tools. They support the co-development of critical thinking, digital literacy, teamwork, and innovation capacities. The integration of pedagogical, technological, and behavioral dimensions of learning provides an alternative to traditional international mobility, ensuring access to quality education even under conditions of social instability, displacement, or limited physical interaction.

The theoretical significance of the monograph lies in its redefinition of virtual exchange as a governance infrastructure for entrepreneurial learning and institutional innovation.

VEHUB4YOU conceptualizes virtual hubs as dynamic systems where:

– knowledge is co-created through distributed mentorship rather than top-down instruction;

– entrepreneurial thinking emerges as a social practice shaped by intercultural collaboration;

– digital education functions as a semantic ecosystem, embedding economic logic into the culture of learning itself.

This conceptual reframing moves beyond instrumental understandings of digital learning, revealing the transformative capacity of virtual exchange to reconfigure relationships among students, educators, and institutions. The proposed VEHUB4YOU model offers an operational framework linking human capital formation, digital innovation, and sustainable entrepreneurship within a unified pedagogical system.

By articulating an integrative theoretical approach grounded in behavioral economics, educational design, and platform studies, the monograph contributes to the ongoing discourse on how digital infrastructures mediate the future of work, education, and transnational cooperation.

Empirically, the VEHUB4YOU initiative validated several key findings that can inform future educational design and policy-making:

– Virtual exchanges enhance employability by fostering practical entrepreneurial and collaborative skills aligned with real economic environments.

– Cross-border interaction in online settings promotes intercultural empathy, tolerance, and civic responsibility - critical attributes for global citizenship.

– Gender-sensitive and inclusive participation strengthens the social sustainability of educational projects.

– Hybrid mentorship mechanisms, where academic and business mentors co-supervise projects, ensure a stronger connection between learning and professional practice.

The project also revealed that students from non-economic disciplines (such as design, humanities, and technology) demonstrate strong engagement in entrepreneurial projects when digital tools and collaborative tasks are properly structured. This underlines the transdisciplinary reach of virtual exchange as a pedagogical paradigm.

In practical terms, the VEHUB4YOU framework provides universities and educators with tested methodologies for designing, managing, and evaluating virtual hubs - modular structures that combine educational content, collaborative platforms, and social learning dynamics.

The VEHUB4YOU monograph aligns with and reinforces the strategic priorities of the European Union, Ukraine, and Azerbaijan, each of which seeks to modernize education through digitalization, innovation, and youth empowerment.

At the European level, the outcomes support the European Education Area (EEA), the Digital Education Action Plan (2021–2027), and the EU Youth Strategy (2022–2027). The project operationalizes these frameworks by transforming the ideals of digital inclusion, sustainability, and innovation into concrete educational practices. It demonstrates that virtual exchange can function as a policy instrument for achieving resilience, inclusion, and equitable access to learning opportunities across the continent.

For Ukraine, the findings complement the goals of the Strategy for Digital Transformation of Education and Science (2022–2027) and the National Recovery Plan, positioning virtual exchange as a mechanism for ensuring academic continuity and youth engagement amid wartime disruption. The monograph provides a scientific foundation for embedding virtual exchange models into national higher education modernization policies and the post-war rebuilding of human capital.

For Azerbaijan, the results align with the Education Development Strategy 2022–2036, emphasizing digital skills, innovative entrepreneurship, and international cooperation. VEHUB4YOU serves as a catalyst for developing transnational education clusters connecting Azerbaijani universities with European networks, enhancing the country's role in the broader Eastern Partnership educational architecture.

Within the Eastern Partnership context, the project illustrates how virtual exchange fosters regional cohesion, intercultural dialogue, and innovation transfer. By merging European values of inclusion and quality with national development priorities, VEHUB4YOU contributes to the creation of a shared educational space bridging Europe and its partner regions.

Building on the VEHUB4YOU experience, the following strategic directions and recommendations are proposed:

1. Institutionalization of Virtual Exchange Models – Universities should integrate virtual hubs into official curricula and accreditation frameworks, ensuring that virtual mobility is recognized as a legitimate component of internationalization.

2. Cross-sector Collaboration – Stronger partnerships between academia, business, and public organizations should be encouraged to ensure the relevance of entrepreneurial education to real market contexts.

3. Sustainability and Scaling – The VEHUB4YOU model can be replicated across other Erasmus+ initiatives, promoting continuous learning ecosystems that unite higher education, youth organizations, and digital platforms.

4. Digital Ethics and Governance – As virtual learning environments expand, there is a growing need for ethical standards in data management, participant engagement, and algorithmic transparency.

5. Monitoring and Evaluation – Future research should focus on developing standardized indicators for assessing the long-term social, educational, and economic impact of virtual exchanges.

6. Policy Integration – National ministries of education and EU bodies should formally incorporate virtual exchange methodologies into future funding schemes under the Erasmus+ 2028–2034 framework.

Through these directions, virtual exchanges can evolve from temporary experiments into sustainable infrastructures for educational innovation and social resilience.

The VEHUB4YOU experience reaffirms that education in the digital age is not confined by physical borders but reconstituted through networks of shared meaning and collective creativity. Virtual exchange represents more than a technical adaptation - it is a new social contract between institutions, educators, and learners, founded on collaboration, openness, and mutual growth.

For the youth of Ukraine, Azerbaijan, and other partner countries, participation in such initiatives signifies belonging to a wider European intellectual community - one that values dialogue over hierarchy and innovation over imitation.

Ultimately, this monograph testifies that virtual exchanges are not an alternative to traditional education but a transformation of its essence: from teaching to co-creation, from national systems to transnational ecosystems, from isolated learning to global citizenship.

In aligning academic innovation with the strategic visions of the European Union and the Eastern Partnership, VEHUB4YOU has contributed not only to the modernization of education but also to the cultivation of a generation capable of navigating - and shaping - the complex futures of a digital, interconnected world.

REFERENCES

Approval of the National Strategy for the Development of Science in the Republic of Azerbaijan for 2009–2015 and the State Program for the Implementation of the National Strategy for the Development of Science in the Republic of Azerbaijan for 2009–2015. [Online]. Available: https://e-qanun.az/framework/17199

Approval of the State Program for the Expansion of Digital Payments in the Republic of Azerbaijan for 2018–2020. [Online]. Available: https://e-qanun.az/framework/40164

Approval of the Strategy for Socio-Economic Development of the Republic of Azerbaijan for 2022–2026. [Online]. Available: https://e-qanun.az/framework/50013

Azerbaijan 2020: A Vision for the Future Development Concept. [Online]. Available: https://e-qanun.az/framework/25029

Azerbaijan 2030: National Priorities for Socio-Economic Development. [Online]. Available: https://president.az/az/articles/view/50474

Electronic Azerbaijan State Program (2005–2008, 2010–2012). [Online]. Available: https://e-qanun.az/framework/19936

National Strategy on Information and Communication Technologies for the Development of the Republic of Azerbaijan (2003–2012). [Online]. Available: https://e-qanun.az/framework/1969

State Program for 2016–2020 on the Implementation of the National Strategy for the Development of the Information Society in the Republic of Azerbaijan. [Online]. Available: https://e-qanun.az/framework/33717

Acs, Z. J., Stam, E., Audretsch, D. B., & O'Connor, A. (2018). The lineages of the entrepreneurial ecosystem approach. *Small Business Economics, 49*(1), 1-10.

AFS Global You. (2025). *Expanding the Impact of Virtual Exchange through GlobalYou*.https://afs.org/2025/02/12/virtual-exchange-global-you/?utm_ source=chatgpt.com

AGB. (2025, May 6). Truth be told: Creating your institution's brand playbook. *Association of Governing Boards Blog*.

Akyol, Z., & Garrison, D. R. (2011). Assessing metacognition in an online community of inquiry. *The Internet and Higher Education, 14*(3), 183–190.

Alamri, H., Lowell, V., Watson, W., & Watson, S. L. (2020). Using Personalized Learning as an Instructional Approach to Motivate Learners in Online Higher

Education: Learner Self-Determination and Intrinsic Motivation. *Journal of Research on Technology in Education*, 52(3), 322–352.

Alario-Hoyos, C., Pérez-Sanagustín, M., Delgado Kloos, C., Parada G., Muñoz-Organero, M., & Rodríguez-de-las-Heras, A. (2016). Analysing the impact of built-in and external social tools in a MOOC on educational technologies. *Computers & Education, 101*, 59–72.

Al-Furaih, S. A., & Al-Awidi, H. M. (2018). Teachers' readiness to implement digital curriculum in Kuwaiti schools. *Education and Information Technologies, 23*(6), 2453–2470.

Allport, G. W. (1954). *The nature of prejudice*. Addison-Wesley.

Alvitez-Temoche, D., Silva, H., Aguila, E. D., et al. (2024). Scientometric Analysis of the World Scientific Production on Augmented and Virtual Reality in Dental Education. *Journal of Contemporary Dental Practice, 25*(4), 358-364.

Ambrose, P. J., Chenoweth, J. D., & Mao, E. (2009). An investigation of cultural intelligence as an antecedent to virtual software development team success. *Issues in Information Systems, 10*(2), 592–600.

Ang, S., & Inkpen, A. C. (2008). Cultural intelligence and offshore outsourcing success: A framework of firm-level intercultural capability. *Decision Sciences, 39*(3), 337–358.

Ang, S., & Van Dyne, L. (2015). *Handbook of cultural intelligence*. Routledge.

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., Zaharia, M., & others. (2010). A view of cloud computing. *Communications of the ACM, 53*(4), 50–58.

Arthur-Holmes, F., Busia, K. A., Vazquez-Brust, D. A., & Yakovleva, N. (2022). Graduate unemployment, artisanal and small-scale mining, and rural transformation in Ghana. *Journal of Sustainable Development, 4*(1), 200.

Artificial Intelligence Strategy of the Republic of Azerbaijan for 2025–2028. March 19, 2025.

ASAN Support to Family Business (ABAD). (n.d.). Retrieved from https://abad.gov.az/

Aškerc Zadravec, K. (2023). *Connections between online international learning and inclusion of intercultural and international elements in the curriculum – The perspective of Slovene academics*. Education Sciences, 13(7).

Audrin, B. (2024). Digital skills at work – Conceptual development and framework. *Technological Forecasting and Social Change, 200*, 123456.

Ausubel, D. P. (1968). *Educational Psychology: A Cognitive View*. Holt, Rinehart and Winston.

Autio, E., & Cao, Z. (2025). Structural Model of Entrepreneurial Ecosystems. Imperial College Business School.

Azerbaijan.az. (n.d.). Official web portal of the Republic of Azerbaijan. Retrieved from https://azerbaijan.az/

Bachmann, N., Rose, R., Maul, V., & Hölzle, K. (2024). What makes for future entrepreneurs? The role of digital competencies for entrepreneurial intention. *Journal of Business Research, 169*, 115-130.

Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The Entrepreneurship Competence Framework*. Luxembourg: Publication Office of the European Union.

Bandera, C., Keshtkar, F., Bartolacci, M. R., Neerudu, S., & Parris, D. L. (2018). Applying effectuation to entrepreneurship education: Empirical evidence. *Journal of Entrepreneurship Education, 21*(1), 1-13.

Baroni, P., Dooly, M., Ingram, N., & Guth, S. (2019). Developing teachers' digital pedagogical competences through virtual exchange. In F. Helm, A. Beaven, & F. De los Arcos (Eds.), *Virtual Exchange in the European Higher Education Area* (pp. 1–14). Research-publishing.net.

Bates, A. W. (2019). *Teaching in a Digital Age: Guidelines for Designing Teaching and Learning*. Tony Bates Associates Ltd.

Bauch, P. (2024). European Union Digital Skills Gap: Challenges and Solutions in an Evolving Technological Landscape. SSRN.

Beelen, J., & Jones, E. (2015). Redefining internationalization at home. In *The European Higher Education Area* (pp. 59–81). Sense Publishers.

Beigel, F., Chiroleu, A., & Gallardo, O. (2022). The ecology of academic knowledge: A Latin American perspective. *Higher Education, 83*(1), 87–104. https://doi.org/10.1007/s10734-021-00725-5

Bell, S. T., & Kozlowski, S. W. (2002). A typology of virtual teams: Implications for effective leadership. *Group & Organization Management, 27*(1), 14-49.

Bell, S., & Bell, R. (2018). Teamwork and assessment in experiential entrepreneurship education. *Education + Training, 60*(3), 229–243.

Bennett, M. J. (1993). Towards ethnorelativism: A developmental model of intercultural sensitivity. In R. M. Paige (Ed.), *Education for the intercultural experience* (pp. 21–71). Intercultural Press.

Bennett, M. J. (2013). Basic Concepts of Intercultural Communication: Paradigms, Principles, and Practices. Boston: Intercultural Press.

Berdou, E. (2020). *Digital infrastructures for development: Reconfiguring the public good*. Palgrave Macmillan.

Berezivska, R. (2024, August 12). *What soft skills employers want to see after the war.* Economic Truth. Retrieved from https://www.epravda.com.ua

Berry, S. (2019). Teaching to connect: Community-building strategies for the virtual classroom. *Online Learning, 23*(1), 164–183.

Bestiantono, D. S., Agustina, P. Z. R., & Cheng, T.-H. (2020). How students' perspectives about online learning amid the COVID-19 pandemic? *Studies in Learning and Teaching, 1*(3), 133–139. Retrieved from https://www.researchgate.net/publication/348067193_How_Students'_Perspectives_about_Online_Learning_Amid_the_COVID-19_Pandemic

Binder, K. (2025). Growing focus on digital skills. European Parliamentary Research Service.

Bocconi, S., Panesi, S., & Costa, C. (2022). Empowering educators for effective digital teaching: Insights from the SELFIE pilot. *European Journal of Education, 57*(3), 356–373.

Boyd, N. G., & Vozikis, G. S. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice, 18*(4), 63-77.

Bringle, R. G., & Clayton, P. H. (2021). Civic Learning through Service Learning: What, So What, Now What? Michigan Journal of Community Service Learning, 27(1), 1–15.

Brown, T. (2008). Design thinking. *Harvard Business Review, 86*(6), 84-92.

Brown, T. (2009). *Change by design: How design thinking creates new alternatives for business and society*. Harvard Business Press.

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. *Public Administration Review, 66*, 44–55.

Bugg-Levine, A., & Emerson, J. (2011). *Impact investing: Transforming how we make money while making a difference*. Jossey-Bass.

Bulto TW, Chebo AK, Endeshaw B, Werku BC and Dhliwayo S (2025). Visualizing digital transformation in entrepreneurship education: a bibliometric analysis study from 2018 to 2022. *Front. Educ. 10*. doi: 10.3389/feduc.2025.1461327

Byram, M. (2021). Teaching and Assessing Intercultural Communicative Competence: Revisited. Multilingual Matters.

Calabria, M. (2021). Entrepreneurship competence in VET: Regional case studies. Cedefop.

Carayannis, E. G., & Campbell, D. F. (2009). 'Mode 3' and 'Quadruple Helix': Toward a 21st-century fractal innovation ecosystem. *International Journal of Technology Management, 46*(3/4), 201–234.

Carlson, J. R., Carlson, D. S., Hunter, E. M., Vaughn, R. L., & George, J. F. (2013). Virtual team effectiveness: Investigating the moderating role of experience with computer-mediated communication on team performance in software development projects. *Computers in Human Behavior, 29*(6), 2672-2682.

Carvalho, L., Rocha, R., Andrade, R., & Pinheiro, P. (2022). Building a Bridge: Knowledge Sharing Flows into Entrepreneurial Ecosystems. *Journal of Open Innovation: Technology, Market, and Complexity, 8*, 144.

Cascavilla, A., Caroli, M. G., & Viganò, G. (2022). Experiential learning and entrepreneurship education: A systematic review. *Education Sciences, 12*(3), 202.

Cedefop (2022). *Digital skills: Challenges and opportunities for vocational education and training in Europe*. Publications Office of the European Union.

Center for Economic Strategy. (2024). *Veteran reintegration through entrepreneurship: Overcoming systemic barriers in Ukraine*. CES Ukraine.

Cesaroni, F. M., & Galvani, S. (2025). Embracing a wide perspective on entrepreneurship education: Challenges in evaluation and technology integration. *Piccola Impresa/Small Business, 3*, 1–22.

Chapleo, C. (2015). Brands in higher education: Challenges and potential strategies. *International Studies of Management & Organization, 45*(2), 150–163.

Chapleo, C., & O'Sullivan, H. (2017). Contemporary thought in university brand management: Perspectives and paradigms. *Journal of Brand Management, 24*(7), 646–657.

Cheah, S., et al. (2023). Barriers to digital transformation in education: A global perspective. *Education and Information Technologies, 28*(1), 123–140.

Chen, G. M., & Starosta, W. J. (2019). The Development and Validation of the Intercultural Sensitivity Scale. Human Communication, 1(1), 1–15.

Cherniavska, O. D. (2025). *Strategic trajectories of university brand management in the digital sphere: A comparative synthesis of international and Ukrainian*

experience. Public Administration Aspects, 13(2), 85–92. https://doi.org/10.15421/152523

Cherniavska, O. D. (2023). Value-driven digital brand management: The values engraved in VEHUB4YOU's logo and digital style. In *Proceedings of the KNUTD Academic Conference* (pp. 181–183). Kyiv, Ukraine: Kyiv National University of Technologies and Design (KNUTD).

Cherniavska, O. D. (2024). *Adapting the PCDL model to university brand management in a digital environment. Economy and Society,* (69), 261–269. https://doi.org/10.32782/2524-0072/2024-69-97

Cherniavska, O., et al. (2023). Transformative innovation, virtual exchange, and collaborative leadership: Reshaping higher education for the global digital world Web 4.0. *Management Journal*, 37(1), Article 10. https://doi.org/10.30857/2415-3206.2023.1.1

Cherniavska, O., Cherniavska, O. D., Bayramov, S. V., Magliocca, P., & Pascalau, R. (2023). Sustainability and innovation: New roles of universities in ensuring economic growth and achieving global sustainable development goals. *Імперативи економічного зростання в контексті реалізації глобальних цілей сталого розвитку: матеріали міжнародної науково-практичної конференції* (p. 190). Kyiv: KNUTD.

Cherniavska, O., Shmygol, N., Cherniavska, O., Belov, A., Järvis, M., & Tsalko, T. (2023). Artificial intelligence in enhancing university Fundraising 5.0: A comprehensive analysis. In *2023 IEEE 5th International Conference on Modern Electrical and Energy Systems (MEES)*. https://doi.org/10.1109/MEES61502.2023.10402529

Cherniavska, O. V., & Vyhivska, O. V. (2023). Formation of a strategy for promoting goods and services on social networks. *Eastern Europe: Economy, Business and Management*, (40), 86–90.

Cherniavska, O. (2018, February 16). *Launch of Multiple Higher Educational Institutions – Masters in Entrepreneurship (MHEI-ME) Online Program: Media release*. Poltava University of Economics and Trade.

Cherniavska, O. (2018, March 13). Presentation of the unique educational project "MHEI-ME: Master's Program in Entrepreneurship of the Consortium of Higher Education Institutions." In *Private Entrepreneur* (pp. 482).

Cherniavska, O. (2018). The fundraising definition appliance for start-ups and SMEs. In *The 16th International Scientific Conference on Information Technology and Management* (p. 35). ISMA University, Riga.

Chernyshova, D. (2023). *The need for digitalization of gender equality policy in educational activities*. Information Technologies and Society, 2(8), 84–89.

Cinganotto, L., & Pagano, A. (2022). Virtual exchange and blended mobility in Italian schools: Challenges and opportunities. *Journal of E-Learning and Knowledge Society, 18*(1), 52–64.

Coates, H. (2014). Analytics in online and blended learning environments. *International Journal of Educational Technology in Higher Education, 11*(1), 1–18.

Cohen, B. (2006). Sustainable valley entrepreneurial ecosystems. *Business Strategy and the Environment, 15*(1), 1–14.

Colpaert, J. (2022). Telecollaboration and entrepreneurship education: Connecting cognitive presence with co-creation. *CALICO Journal, 39*(1), 1–19.

Cope, J. (2011). Entrepreneurial learning from failure: An interpretative phenomenological analysis. *Journal of Business Venturing, 26*(6), 604-623.

Correia, M.P., Marques, C.S., Silva, R. et al. (2024). Academic Entrepreneurship Ecosystems: Systematic Literature Review and Future Research Directions. *J Knowl Econ 15*, 17498–17528. https://doi.org/10.1007/s13132-024-01819-x

Corsaro, D., Cantù, C., & Di Guardo, M. C. (2021). Preparing entrepreneurship educators in Europe: A comparative study. *International Journal of Entrepreneurship and Small Business, 43*(2), 178–196.

Coursera Platform. https://www.coursera.org/

Crawford, I., Luck, S. L., et al. (2020). Employability through experiential delivery of intercultural communication skills online. In *6th International Conference on Higher Education Advances (HEAd'20)*.

CUNY, LaGuardia Community College. (n.d.). *Collaborative Online International Learning (COIL)*.

Curci, N., & Micozzi, A. (2014). Entrepreneurial activity and education in Italy. Banca d'Italia.

Curtis, T., Abratt, R., & Minor, W. (2009). Corporate brand management in higher education: The case of ERAU. *Journal of Product & Brand Management, 18*(6), 404–413.

Daspit, J. J., Fox, C. J., Findley, S. K., & Ready, K. J. (2023). The nature and dimensions of entrepreneurial thinking: A systematic literature review and research agenda. *Journal of Small Business Management, 61*(2), 485-508.

Data Insights Market. (2025). Virtual Study Abroad Programs Growth Opportunities and Market Trends. https://www.datainsightsmarket.com/reports /virtual-study-abroad-programs-1929473

Deardorff, D. K. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. *Journal of Studies in International Education, 10*(3), 241–266.

Deardorff, D. K. (2020). Manual for Developing Intercultural Competence: Theory, Practice and Research. London: Routledge.

Digital Development Concept of the Republic of Azerbaijan. January 16, 2025.

Digital Skills and Jobs Platform. (2024). National initiatives.

Diia.Business. (n.d.). *National project for the development of entrepreneurship and exports*. Retrieved September 10, 2025, from https://business.diia.gov.ua/

Diia.Business. (n.d.). *Ramka pidpryiemnytskykh kompetentsii - EntreComp+: yak pidpryiemtsiam reahuvaty na hlobalni vyklyky ta tekhnolohichni trendy maloho y serednoho biznesu* [The Entrepreneurship Competence Framework - EntreComp+: how entrepreneurs can respond to global challenges and technological trends in small and medium-sized businesses]. Retrieved from

DiMaggio, P., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147–160.

Dombrovska, S. M., & Shevchuk, Yu. R. (2022). *Development of academic mobility in the modern educational process*. Bulletin of the National University of Civil Protection of Ukraine, 1(16), 197–204.

Dooly, M., & O'Dowd, R. (Eds.). (2012). *Researching Online Foreign Language Interaction and Exchange*. Peter Lang.

Dorn, Jürgen & Pichlmair, Markus. (2007). A Competence Management System for Universities. Proceedings of the 15th European Conference on Information Systems, ECIS 2007. p.759-770. https://www.researchgate.net/publication/221407544_A_Competence_Management_System_for_Universities

Downes, S. (2012). Connectivism and connective knowledge: Essays on meaning and learning networks. National Research Council Canada.

Drucker, P. F. (1985). *Innovation and Entrepreneurship: Practice and Principles*. Harper & Row.

Dunleavy, M., & Dede, C. (2019). Augmented reality teaching and learning. In *Handbook of Research on Educational Communications and Technology* (pp. 735–745). Springer.

Duolingo Platform. https://en.duolingo.com/

Dweck, C. S. (2008). *Mindset*. Ballantine Books.

Dzherstat of Ukraine. (2017). *Women and men / Demographic and social statistics / Education*. State Statistics Service of Ukraine.

Earley, P. C., & Ang, S. (2003). *Cultural intelligence: Individual interactions across cultures*. Stanford University Press.

Eby, L. T., Allen, T. D., Evans, S. C., Ng, T., & DuBois, D. L. (2008). Does mentoring matter? A multidisciplinary meta-analysis comparing mentored and non-mentored individuals. *Journal of Vocational Behavior, 72*(2), 254–267.

Education and Information Technologies. (2022). DigComp-Based Digital Competence Assessment Tools: Literature Review and Instrument Analysis, 27(8), 10843-10867.

edX Platform. https://www.edx.org/

EIT Digital (2022). The Future of Education for Digital Skills.

ElgarOnline. (2024). Revising digital entrepreneurial ecosystems: an integrative framework and future research agenda. In *Revising Digital Entrepreneurial Ecosystems* (pp. 1–25).

Eliseeva, O., & Eliseev, E. (2020). Online education: Comparative analysis of online platforms for learning in the world. *Bulletin of Khmelnytsky National University. Economic Sciences, (3),* 219–226.

ERA Ukraine. (n.d.). *R&D, rozvytok molodizhnoho pidpryiemnytstva ta startapiv* [R&D, development of youth entrepreneurship and startups]. Retrieved from https://era-ukraine.org.ua/r-d-rozvytok-molodizhnoho-pidpryyemnytstva-ta-startapiv/

Erasmus+ National Office in Ukraine. (2024). VEHUB4YOU project events and results.

Erasmus+ Office Ukraine. (n.d.). *Virtualni obminy u sferakh vyshchoi osvity ta molodi* [Virtual exchanges in the fields of higher education and youth]. Retrieved from https://erasmusplus.org.ua/opportunities/mozhlyvosti-dlya-organizaczij/virtualni-obminy-u-sferah-vyshhoyi-osvity-ta-molodi/

Erasmus+ Virtual Exchanges. (2025). *Virtual exchanges projects consist of online people-to-people activities that promote intercultural dialogue and soft skills*

development. https://erasmus-plus.ec.europa.eu/programme-guide/part-b/key-action-1/virtual-exchanges

eTwinning. (2021). *eTwinning: The Community for Schools in Europe*. https://en.wikipedia.org/wiki/Virtual_exchange

European Business Association. (2024). *Small Business Sentiment Index: Key obstacles and expectations*. EBA. https://eba.com.ua/research/indeks-nastroyiv-malogo-biznesu-2024

European Commission. (2018). *EntreComp: The European Entrepreneurship Competence Framework*.

European Commission. (2018). *Entrepreneurship competence framework (EntreComp)*.

European Commission. (2020). *Digital Education Action Plan 2021–2027*. Publications Office of the European Union.

European Commission. (2020). *Erasmus+ Virtual Exchange: Annual Report*.

European Commission. (2020). *Guidelines on dissemination and exploitation of results: Horizon 2020 and Erasmus+ projects*. Publications Office of the European Union.

European Commission. (2021). *2030 Digital Compass: The European way for the Digital Decade*. Publications Office of the European Union.

European Commission. (2021). *Digital Education Action Plan 2021-2027: Unlocking Europe's digital potential*. European Education Area.

European Commission. (2021). *Erasmus+ programme guide*. Publications Office of the European Union.

European Commission. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens*. Publications Office of the European Union.

European Commission. (2023). *Europe's Digital Decade: 2023 Report*.

European Commission. (2023). European Digital Skills Certificate (EDSC).

European Commission. (2025, February 25). Erasmus+ support to Ukraine: Three years of solidarity and action.

European Commission. (n.d.). Managing your project under a grant agreement.

European Parliament Think Tank. (2025). Growing focus on digital skills.

Eurostat. (2023). Digital skills in 2023: impact of education and age.

Eurostat. (2023). Youth Unemployment Statistics.

Eurostat. (2024). Digital skills in 2023: impact of education and age.

Eurydice. (2025, March 28). *Ukraine: Digital transformation of education as a strategic path to resilience and innovation*. European Commission. Retrieved from https://eurydice.eacea.ec.europa.eu/news/ukraine-digital-transformation-education-strategic-path-resilience-and-innovation

Faizuplyaeva, N. S. (2016). *On the Study of Economic Categories in the Formation of Economic Competencies. Modern Problems of Social and Humanitarian Sciences.*

Fayolle, A., & Gailly, B. (2008). From craft to science: Teaching models and learning processes in entrepreneurship education. *Journal of European Industrial Training, 32*(7), 569–593.

Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. *Journal of Small Business Management, 53*(1), 75-93.

Fayolle, A., Gailly, B., & Lassas-Clerc, N. (2006). Assessing the impact of entrepreneurship education programmes: A new methodology. *Journal of European Industrial Training, 30*(9), 701–720.

Fedorov M., Ioann V. Lyakh V., Naneva T. Description of the digital competence framework for entrepreneurs of Ukraine Based on DigCompUA, DigComp 2.1 and EntreComp EU Ministry of Digital Transformation of Ukraine 2021 55 p. https://osvita.diia.gov.ua/uploads/0/2904-2605_co_ramka_pidpriemca_11_2021_compressed.pdf (Accessed 12 Oct 2025)

Fedulova L. (2016). University Innovation Ecosystem. Scientia fructuosa. 108, 4 (Sep 2016), 162–177. (Accessed 12 Oct 2025)

Fenwick, T., & Edwards, R. (2010). *Actor-network theory in education*. Routledge.

Ferguson, R., & Clow, D. (2016). Where is the evidence? A call to action for learning analytics. *Proceedings of the Sixth International Conference on Learning Analytics & Knowledge*, 56–65.

Fernández, A., et al. (2023). Digital transformation initiatives in higher education institutions. *Education and Information Technologies, 28*, 1–27.

Fernández-Arias, P., Sánchez-Jiménez, M., Antón-Sancho, Á., Nieto-Sobrino, M., & Vergara, D. (2025). Digital Competence of Rural Teachers in Depopulated Regions of Spain: A Bibliometric Review. *European Journal of Investigation in Health, Psychology and Education*, *15*(1), 5. https://doi.org/10.3390/ejihpe15010005

Ferreira-Lopes, L., & Elexpuru-Albizuri, I. (2022). Integrating SDG 12 into business studies through intercultural virtual collaboration. *Sustainability, 14*(7), 4234. https://doi.org/10.3390/su14074234

Fiet, J. O. (2001). The theoretical side of teaching entrepreneurship. *Journal of Business Venturing, 16*(1), 1-24.

Fitzgerald, C. (2020). Student engagement in virtual entrepreneurship education. *International Journal of Management Education, 18*(4), 100405.

Foroudi, P., Melewar, T. C., & Gupta, S. (2017). Corporate logo: History, significance and implications for corporate brand management. *Business Horizons, 60*(5), 673–682.

Foroudi, P., Yu, Q., Gupta, S., & Foroudi, M. M. (2019). Enhancing university brand image and reputation through customer value co-creation behaviour. *Technological Forecasting and Social Change, 138*, 218–227.

Frontiers in Education. (2023). Intercultural Competencies in Higher Education: A Systematic Review from 2016 to 2021.

Frontiers in Education. (2024). Immersive learning platforms: analyzing virtual reality contribution to competence development in higher education - a systematic literature review.

Gabriel, M. (2021). *eTwinning community of schools reaches 1 million registered users*. European Union, European Education Area.

Gaitán-Aguilar, L., et al. (2024). A review of research on global citizenship in higher education. *International Journal of Educational Development*.

Gangi, Y., & Sirelkatim, F. (2023). The Best Practices in Entrepreneurship Education: A Review, Conceptual Model, and Propositions. *Journal of Entrepreneurship Education, 26*(4), 1-14.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105.

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education, 13*(1–2), 5–9.

George, G., McGahan, A. M., & Prabhu, J. (2012). Innovation for inclusive growth: Towards a theoretical framework and a research agenda. *Journal of Management Studies, 49*(4), 661–683.

Gibb, A. A. (2002). In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: Creative destruction, new values, new ways of doing things and new combinations of knowledge. *International Journal of Management Reviews, 4*(3), 233–269. https://doi.org/10.1111/1468-2370.00086

Globalschoolsforum.org. (2023). Monitoring, Evaluation, and Learning (MEL) Framework.

Gnatenko, Ya. (2019). *Intercultural competence of future economists: Scientific and pedagogical aspect*. Origins of Pedagogical Mastery, (24), 53–57.

Golovan M.S. (2011) Competence and competence: a comparative analysis of concepts. Pedagogical sciences: theory, history, innovative technologies. No. 8(18). P. 224-234.

González-Zamar, M.-D., & Abad-Segura, E. (2020). Implications of Virtual Reality in Arts Education: Research Analysis in the Context of Higher Education. *Education Sciences, 10*(9), 225.

Grech, A., & Camilleri, A. F. (2017). *Blockchain in Education*. Publications Office of the European Union.

Groff, J. (2013). Technology-rich innovative learning environments. *OECD CERI Innovative Learning Environment Project,* 1–30. Retrieved from https://www.researchgate.net/publication/307981656_Technology-rich_innovative_learning_environments

Growth Market Reports. (2025). Virtual Study Abroad Experiences Market Research Report.

Gudykunst, W. B. (2018). Bridging Differences: Effective Intergroup Communication. Thousand Oaks, CA: Sage Publications.

Gurt.org.ua. (2023, August 30). *Prohramy vid Junior Achievement Ukraine startuiut z pochatkom navchalnoho roku u 12 rehionakh Ukrainy* [Programs from Junior Achievement Ukraine start with the beginning of the school year in 12 regions of Ukraine]. Retrieved from https://gurt.org.ua/news/informator/90189/

Guth, S., Helm, F., & O'Dowd, R. (2020). Telecollaboration and virtual exchange across disciplines: An introduction. In *Telecollaboration and Virtual Exchange Across Disciplines* (pp. 1–14). Research-publishing.net.

Gutiérrez, J.M., & Beatriz, A.D. (2017). Virtual Technologies Trends in Education. *Journal of Mathematics Science and Technology Education*, 13(2), 469–486. DOI: 10.12973/eurasia.2017

Hägg, G. (2022). *Entrepreneurship education: Scholarly progress and future directions*. Edward Elgar.

Hahn, D., Minola, T., Bosio, G., & Cassia, L. (2017). The impact of entrepreneurship education on university students' entrepreneurial skills: A systematic literature review. *Education Research International, 2017*, 1–13.

Hamilton, E., Svrcek, A., & Goto, K. (2021). Distributed mentorship and its role in collaborative learning. *Educational Technology Research and Development, 69*, 1017–1034.

Hammoda, B., & Foli, S. (2024). A digital competence framework for learners (DCFL): A conceptual framework for digital literacy. *Knowledge Management & E-Learning, 16*(3), 477–500.

Harms, R. (2015). Self-regulated learning, team learning and project performance in entrepreneurship education: Learning in a lean startup environment. *Technological Forecasting and Social Change, 100*, 21-28.

Hasan, M., Noor, N., Rahman, S., & Rahman, M. (2020). The Transition from Intelligent to Affective Tutoring Systems: A Review and Open Issues. *IEEE Access*.

Hatch, M. J., & Schultz, M. (2010). Toward a theory of brand co-creation with implications for brand governance. *Journal of Brand Management, 17*(8), 590–604. Helm, F. (2018). Virtual exchange for intercultural learning. In R. O'Dowd & T. Lewis (Eds.), *Online intercultural exchange: Policy, pedagogy, practice* (pp. 21–41). Routledge.

Haynie, J. M., & Shepherd, D. A. (2009). A measure of adaptive cognition for entrepreneurship research. *Entrepreneurship Theory and Practice, 33*(3), 695-714.

Haynie, J. M., Shepherd, D., Mosakowski, E., & Earley, P. C. (2010). A situated metacognitive model of the entrepreneurial mindset. *Journal of Business Venturing, 25*(2), 217-229.

Helm, F. (2020). Virtual Exchange and the Development of Intercultural Competence. Language Learning & Technology, 24(3), 103–119.

Helm, F. (2020). Virtual exchange for global citizenship education: Awareness, skills, and attitudes. *Foreign Language Annals, 53*(2), 262–282.

Helm, F. (2024). Global citizenship online in higher education. *Educational Research for Policy and Practice*. https://pubmed.ncbi.nlm.nih.gov/38625284

Hemsley-Brown, J., & Oplatka, I. (2022). *University marketing and branding: International perspectives*. Routledge. https://doi.org/10.4324/9781003289475

Herrero, I. (2018). How familial social capital and social capital at the community level influence the entrepreneurial process. *International Entrepreneurship and Management Journal, 14*(1), 195–219.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*(3), 235–266.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. Online Readings in Psychology and Culture, 2(1), 8–26.

Holmes, W., Bialik, M., & Fadel, C. (2020). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Center for Curriculum Redesign.

Horizon Results Booster. (n.d.). *About*. https://www.horizonresultsbooster.eu/about

House of Europe. (2023). Annual Report on Educational Mobility and Cultural Cooperation in Ukraine. Київ: House of Europe.

Howard, S. K., & Mozejko, A. (2015). Teachers: Technology, change and resistance. In M. Henderson & G. Romeo (Eds.), *Teaching and Digital Technologies: Big Issues and Critical Questions* (pp. 307–317).

Howard, S. K., Tondeur, J., & Yang, J. (2021). Teacher professional development for technology integration: A socio-material perspective. *Educational Technology Research and Development, 69*(3), 1237–1259. https://business.diia.gov.ua/news/ramka_pidpryiemnytskykh_kompetentsii_entresomp

Hunter, J., & Lean, J. (2018). Entrepreneurial learning: A practical model from the creative industries. *Education + Training, 60*(3), 286–303.

Huseynzade, R. L., Azizova, Z. M., Aliyev, A. H., & Verdiyeva, U. M. (2021). *Pedagogy: Textbook.* Baku: Mütercim Publishing House.

Iacobucci, D., & Micozzi, A. (2012). Entrepreneurship education in Italian universities: Trend, situation and opportunities. *Education & Training, 54*(8-9), 673-696.

IFC. (2025). How Blended Finance Works. International Finance Corporation.

Iglesias, O., & Ind, N. (2016). How to be a brand with a conscience. *Marketing Intelligence & Planning, 34*(5), 772–783. https://doi.org/10.1108/MIP-10-2015-0213

Iglesias, O., Ind, N., & Schultz, M. (2020). Towards a theory of conscientious corporate brand co-creation. *Journal of Product & Brand Management, 29*(5), 1–13. https://doi.org/10.1057/s41262-020-00205-7

Iglesias, O., Markovic, S., & Ind, N. (2020). Do social media enhance brand co-creation? An analysis of university branding. *Public Relations Review, 46*(4), 101947. https://doi.org/10.1016/j.pubrev.2020.101947

Ilko Kucheriv Democratic Initiatives Foundation. (2024). *Corruption in Ukraine: Public opinion – 2024*. DIF. https://dif.org.ua/article/koruptsiya-v-ukraini-gromadska-dumka-2024

Ilnytskyi D. (2017). Quality management of university competencies: from self-assessment to international comparisons. International economic policy. No. 1(26). K.: KNEU, 2017, P. 72-98 URL: http://iepjournal.com/journals/26/2017_4_Ilnytskyy.pdf (Accessed 12 Oct 2025)

Implementing and Using Quality Assurance: Strategy and Practice. (n.d.). *A Selection of Papers from the 2nd European Quality Assurance Forum.*https://www.enqa.eu/wp-content/uploads/2nd-Forum-Implement.-Using-QA_final-1.pdf

Ind, N., & Schmidt, H. J. (2019). *Branding inside out: A social identity approach to brand co-creation*. Springer.

Ind, N., Iglesias, O., & Markovic, S. (2013). The co-creation of value in higher education: The role of brand communities. *Journal of Business Research, 66*(10), 2116–2123. https://doi.org/10.1016/j.jbusres.2013.02.006

Ind, N., Iglesias, O., & Schultz, M. (2013). Building brands together: Emergence and outcomes of co-creation. *California Management Review, 55*(3), 5–26.https://doi.org/10.1525/cmr.2013.55.3.5

INDIRE. (2019). Rapporto nazionale sull'innovazione didattica e digitale nelle scuole italiane. Istituto Nazionale di Documentazione, Innovazione e Ricerca Educativa.

INDIRE. (2022). eTwinning Annual Report – Italy. Istituto Nazionale di Documentazione, Innovazione e Ricerca Educativa.

International Association for Quality Assurance in Pre-tertiary and Higher Education. (n.d.). *Home page.* 2025, from https://www.qahe.org/

Ioannis Sitaridis, Fotis Kitsios (2024); Digital entrepreneurship and entrepreneurship education: a review of the literature. International Journal of Entrepreneurial Behavior & Research 11 March 2024; 30 (2-3): 277–304. (Accessed 12 Oct 2025). https://doi.org/10.1108/IJEBR-01-2023-0053

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management, 29*(6), 963-989.

Isenberg, D. (2010). How to start an entrepreneurial revolution. *Harvard Business Review, 88*(6), 40–50.

Isenberg, D. J. (2011). The entrepreneurship ecosystem strategy as a new paradigm for economic policy: Principles for cultivating entrepreneurship. *Babson Entrepreneurial Ecosystem Project*.

JA Ukraine. (n.d.). *JA Company Programme | Navchalna prohrama z pidpryiemnytstva dlia molodi* [JA Company Programme | Entrepreneurship training program for youth]. Retrieved from https://ja-ukraine.org/programs/programa-kompanija/

Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2020). Semantic interoperability in digital government: A living lab approach. *Government Information Quarterly, 37*(1), 101420.

Jardim, J. (2021). Entrepreneurial Skills to Be Successful in the Global and Digital World: Proposal for a Frame of Reference for Entrepreneurial Education. *Education Sciences, 11*(7), 356.

Joint Research Centre. (2025). How to reach the EU target of 80% of adults with basic digital skills by 2030?

Judijanto, L., Baruno, Y. H. E., & Halim, C. (2024). Analyzing Research Trends and Future Directions in Entrepreneurship Education with a Bibliometric approach. *East South Journal*, 2(02), 132–145. https://doi.org/10.58812/esle.v2i02.303.

Judith Helmer, Selin Kozat, Leonie Pöter, Evgenii Shtofblat, Neele Wolff, Laura Daniel (2024) Digital and entrepreneurial competencies. *Wirtschaft (MSB).* № 17 (Accessed 12 Oct 2025). https://doi.org/10.25974/fhms-19049

Juhász, T., Kálmán, B., Toth, A. & Horváth, A. (2022). Digital competence development in a few countries of the European Union. *Management & Marketing. Challenges for the Knowledge Society*. *17*. 178-192. doi: 10.2478/mmcks-2022-0010.

Junior Achievement Ukraine. (n.d.). *Programs*. Retrieved September 10, 2025, from https://ja-ukraine.org/programi/

Kapp, K. M. (2012). *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*. Pfeiffer.

Karakılçık, N., & Uçar, **S.** (2021). *Describing the Development of Some Basic Entrepreneurial Skills in Out-of-School Learning Environments. Trakya Journal of Education,* 12(January), 221–234.

Kasych, A. O. (2024, October 4). Student exchange programs as a mechanism for integrating Ukrainian universities into the European educational space. In *Proceedings of the VI International Scientific and Practical Conference Problems of Integrating Education, Science and Business in the Context of Globalization* (pp. 268–269). Kyiv: KNUTD.

Kasych, A., Cherniavska, O., Ruban, D., Glukhova, V., Golub, V., & Nefedova, T. (2023). Artificial intelligence as a tool of local self-government and democracy development during the formation of Industry 5.0 and Society 5.0. In *2023 IEEE 5th International Conference on Modern Electrical and Energy Systems (MEES)*. https://doi.org/10.1109/MEES61502.2023.10402417

Kasych, A. O., Cherniavska, O. V., Bondarenko, S. M., Shkoda, M. S., et al. (2024). *Government 5.0 як основа ефективності державно-приватних партнерств у період повоєнного відновлення України* [Monograph]. In A. O. Kasich & I. O. Tarasenko (Eds.). Kyiv: KNUTD.

Kickul, J., & Lyons, T. S. (2012). *Understanding social entrepreneurship: The relentless pursuit of mission in an ever-changing world*. Routledge.

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating training programs: The four levels* (3rd ed.). Berrett-Koehler.

Knight, F. H. (1921). *Risk, Uncertainty, and Profit*. Houghton Mifflin.

Knox, S. (2022). Fostering student engagement in virtual entrepreneurship education environments. *International Journal of Management Education, 20*(3), 100705.

KNUTD. (2025). Implementation of business simulation methodologies in practical trainings for the development of entrepreneurial competencies within the Erasmus+ VEHUB4YOU Project. Kyiv National University of Technologies and Design.

KNUTD. (2025a, February 14). *Development of entrepreneurial skills through business simulations: Start of trainings within the Erasmus+ VEHUB4YOU project*. Kyiv National University of Technologies and Design. Retrieved from https://en.knutd.edu.ua/events-and-publications/news/18020/

KNUTD. (2025b, April 7). *Implementation of business simulation methodologies in practical trainings for the development of entrepreneurial competencies within the Erasmus+ VEHUB4YOU project*. Kyiv National University of Technologies and Design. Retrieved from https://en.knutd.edu.ua/events-and-publications/news/18204/

Kobayashi, K., Okamuro, H., & Nishimura, J. (2006). The effect of social capital on the creation of business startups in Japan. *Small Business Economics, 26*(3), 227–240.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education, 9*(1), 60–70.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Kolb, D.A. (2015) Experiential Learning: Experience as the Source of Learning and Development. 2nd Edition, Pearson Education, Inc. https://www.researchgate.net/publication/235701029_Experiential_Learning_Experience_As_The_Source_Of_Learning_And_Development (Accessed 12 Oct 2025)

Kollmann, T., Lomberg, C., & Peschl, A. (2022). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice, 46*(2), 399–422.

Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? *International Review of Research in Open and Distributed Learning, 9*(3), 1–13.

Kovalenko I.I., Bidyuk P.I., Gozhyy O.P. (2004). Introduction to systems analysis: Textbook. Mykolaiv: Petro Mohyla Moscow State University, 2004. – 148 p.

Kovalenko O. P. (2020). *Pidpryiemnytskyi potentsial osobystosti: sotsialno-psykholohichnyi vymir* [Entrepreneurial potential of the individual: A socio-psychological dimension]. Naukova dumka.

Kovalenko, O. I., & Tkachuk, V. P. (2021). Problemy implementatsii pidpryiemnytskoi kompetentnosti v systemi vyshchoi osvity Ukrainy [Problems of implementation of entrepreneurial competence in the higher education system of Ukraine]. *Ekonomika ta upravlinnia, 3*(91), 115–123.

Kraus, N., Kraus, K. and Andrusiak, N. (2021), Teaching digital entrepreneurship: innovative techniques, technologies, types and methods, Efektyvna ekonomika, [Online], vol. 2, available at: http://www.economy.nayka.com.ua/?op=1&z=8643 (Accessed 12 Oct 2025). DOI: 10.32702/2307-2105-2021.2.7

Kravchyna, S. (2023). *Tsyfrovi instrumenty u formuvanni pidpryiemnytskoi kompetentnosti vchyteliv* [Digital tools in the formation of entrepreneurial competence of teachers]. Digital Library NAES of Ukraine. Retrieved from https://lib.iitta.gov.ua/id/eprint/743685/1/Kravchyna_Naukovi_Zapyski__N31-51-62.pdf

Krueger, N. F. (2007). What lies beneath? The experiential essence of entrepreneurial thinking. *Entrepreneurship Theory and Practice, 31*(1), 123-138.

Kuhlmann, S., Stegmaier, P., & Konrad, K. (2019). The tentative governance of emerging science and technology - A conceptual introduction. *Research Policy, 48*(5), 1091–1107.

Kuratko, D. F. (2016). *Entrepreneurship: Theory, process, and practice* (10th ed.). Cengage Learning.

Kuznetsova, O. O., & Kolomyitseva, A. O. (2021). *Intercultural communication in the conditions of globalization of higher education in Ukraine*. In I. A. Kolesnikova

(Ed.), Strategies of Intercultural Communication in Language Education of Modern Universities (pp. 95–97). Kyiv National Economic University.

Kyiv National University of Technologies and Design. (2025, February 14). *Development of entrepreneurial skills (trainings within Erasmus+ VEHUB4YOU)*. https://en.knutd.edu.ua/events-and-publications/news/18020

Kyiv National University of Technologies and Design. (2025). *Youth debates and case competitions within the Erasmus+ VEHUB4YOU project*. https://en.knutd.edu.ua/events-and-publications/news/18575

Kyiv National University of Technologies and Design. (2025, February 26). *Interactive training on crisis marketing (Erasmus+ VEHUB4YOU)*. https://en.knutd.edu.ua/events-and-publications/news/18050

Kyiv National University of Technologies and Design. International Educational Projects https://en.knutd.edu.ua/international_knutd/international_educational_projects/

Lackéus, M. (2015). *Entrepreneurship in education: What, why, when, how*. OECD Publishing.

Lackéus, M. (2018). What is value? – A framework for analyzing and facilitating entrepreneurial value creation. Gothenburg: Chalmers University of Technology. https://doi.org/10.18261/issn.1893-8981-2018-01-02 (Accessed 12 Oct 2025)

Landers, R. N., Auer, E. M., Collmus, A. B., & Armstrong, M. B. (2018). Gamification of adult learning: A systematic literature review. In *Gamification in Education and Business* (pp. 415–435). Springer.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Leiko S.V. (2013) The concept of competence and competence: theoretical analysis. Pedagogical process: theory and practice. 2013. Issue 4. P. 128-135. URL: access: http://nbuv.gov.ua/UJRN/pptp_2013_4_15 (Accessed 12 Oct 2025)/

Lenkaitis, C. A., & Loranc, B. (2021). *The role of intercultural virtual exchanges in global citizenship development*. Journal of International and Intercultural Communication, 15(2), 222–234.

Leonardi, P. M. (2013). Theoretical foundations for the study of sociomateriality. *Information and Organization, 23*(2), 59–76.

Liu, Y., Gryshchenko, I. M., Cherniavska, O. V., Morhulets, O. B., Cherniavska, O. D., & Wang, Z. (2022). International innovation collaboration of business and higher education in a framework of the Chinese global initiative “One Belt – One

Road": Background and prospects. *International Journal of Management*, 13(10), 42–53.

Li, W., Li, X., & Li, Y. (2021). Social capital and e-commerce adoption: Empirical evidence from Chinese farmers. *Information Technology for Development, 27*(2), 376–395.

Lin, Y., Wang, S., & Lan, Y. (2022). The study of virtual reality adaptive learning method based on learning style model. *Computer Applications in Engineering Education, 30*(2), 396–414. https://doi.org/10.1002/cae.22462

Liu, Y., & Dang, Y. (2020). Modeling algorithmic thinking for K-12: A systematic review of the literature. *Educational Psychology Review, 32*(4), 1081–1102.

Livingstone, S., & Helsper, E. (2007). Gradations in digital inclusion: Children, young people and the digital divide. *New Media & Society, 9*(4), 671–696.

Luckin, R. (2010). *Re-designing learning contexts: Technology-rich, learner-centred ecologies*. Routledge.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*. Pearson.

Luik, J. E., Ng, J., & Hook, J. (2019). Virtual Hubs: Understanding relational aspects and remediating incubation. Preprint, University of York.

Machackova H, Jaron Bedrosova M, Muzik M, Zlamal R, Fikrlova J, Literova A, Dufkova E, Smahel D, Boomgaarden H, Song H, Tolochko P, d'Haenens L, Joris W, Kalmus V, Tikerperi ML, Opermann S, Napp M, Soidla I, Uibos A, Soo K, Salmela-Aro K, Järvinen J, Mannerström R, Suvila E, Waechter N, Brando C, Kadera S, Mascheroni G, Cino D, Lombi L, van Deursen A, van Laar E, Pyżalski J, Walter N, Iwanicka A, Ponte C, Batista S, Baptista R, Schneider L, Helsper EJ. (2024). Digital skills among youth: A dataset from a three-wave longitudinal survey in six European countries. *Data Brief*. *9*(54), 110396. doi: 10.1016/j.dib.2024.110396.

Malik-Kozlowska, B., & Kozlowski, R. (2025). Overcoming Challenges in Project-Based Learning: Educator Reflections on Interdisciplinary Coordination and Pedagogical Shifts in Entrepreneurship Education. *IBIMA Education Journal, 44EDU(2024), 4431024*.

Mandel, L., & Noyes, E. (2016). Mentoring in entrepreneurship education: Challenges and opportunities. *Entrepreneurship Education, 1*(1), 23–39.

Marsinah, M., Umar, U., Hatidah, H., Fitri Indriani, R. ., & Purwanto, M. B. (2024). Entrepreneurship Education in Universities: A Review of Current Practices and Future Directions. *Indonesian Journal of Advanced Research, 3*(6), 705–718. https://doi.org/10.55927/ijar.v3i6.9561.

Mason, C., & Arshed, N. (2013). Teaching entrepreneurship to university students through experiential learning: A case study. *Industry and Higher Education, 27*(6), 449-463.

McNeil, S. G., Robin, B. R., & Miller, R. M. (2000). Facilitating interaction, communication and collaboration in online courses. *Computers & Geosciences, 26*(6), 699-708.

MDPI. (2024). Development and State of the Art of Entrepreneurship Education: A Bibliometric Review. *Education Sciences, 14*(3), 295.

Mezirow, J. (1991). *Transformative dimensions of adult learning*. Jossey-Bass.

Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education, 1997*(74), 5–12.

Miletus Project. (2019). *Guide to Virtual Mobility – The Future of Education*.

Mingachevir State University. (n.d.). Retrieved from https://mdu.edu.az/

Ministry of Economy of Ukraine. (2025). *Results of the eRobota grant program for 2022-2024*. Government of Ukraine.[1]

Ministry of Education and Science of Ukraine. (2025, February 20). *Estoniia dopomahaie vprovadyty pidpryiemnytsku osvitu v Ukraini* [Estonia helps to implement entrepreneurship education in Ukraine]. Retrieved from https://mon.gov.ua/news/estoniia-dopomahaie-vprovadyty-pidpryiemnytsku-osvitu-v-ukraini

Mintz, S. (n.d.). *The forces that are shaping the future of higher education. Forbes.* Retrieved from https://www.insidehighered.com/blogs/higher-ed-gamma/forces-are-shaping-future-higher-education

MIUR. (2015). *Piano Nazionale Scuola Digitale*.

MIUR. (2022). Linee guida per i Percorsi per le Competenze Trasversali e per l'Orientamento (PCTO).

Moberg, K., Vestergaard, L., Fayolle, A., Redford, D., Cooney, T., Singer, S., & Filip, D. (2014). *How to assess and evaluate the influence of entrepreneurship education: A report of the ASTEE project*. Publications Office of the European Union.

Monitoring local requirements, initial needs and expectations of participants (students and facilitators) in creating an international network of virtual youth business hubs. (2023, February–May). Project Report.

Moore, M. G. (2013). The theory of transactional distance. In M. G. Moore (Ed.), *Handbook of distance education* (3rd ed., pp. 66–85). Routledge. https://doi.org/10.4324/9780203803738.ch5

Morris, M. H., & Liguori, E. W. (2016). Preparing students for the new reality. *Journal of Management Education, 40*(5), 638–647.

Motta, V. F., & Ribeiro, G. S. V. (2023). Experiential learning in entrepreneurship education: A systematic literature review. *Education Sciences, 13*(1), 1–19.

Mustafayeva, A.M. (2021). Development Perspectives of Artificial Intelligence Technologies. In *Proceedings of the International Scientific Conference Sustainable Development Strategy: Global Trends, National Experiences, and New Goals*, Mingachevir State University, December 10-11, pp. 47–53.

Mustafayeva, A.M., & Bakhshiyeva, G.S. (2022). The Importance and Role of Distance Learning Systems in a Digitalized Society. *Scientific-Methodological Journal*, Nakhchivan State University, *Scientific Works*, pp. 311–316.

Mustafayeva, A.M., Aliyeva, A.A., & Israfilova, E.N. (2023). The Impact of VR Technologies on the Educational Process in a Digital Society. In *Proceedings of the Republican Scientific-Theoretical Conference Stages of Development in Education: Digitalization and Future Prospects*, dedicated to the 100th Anniversary of the National Leader Heydar Aliyev, Nakhchivan State University, May 4-5, pp. 138–143.

Mustafayeva, A.M., Nasirov, S.S., & Ahmadov, N.K. (2024). Challenges and Prospects of Applying Artificial Intelligence Technologies in Education. *Theory and Practice of Science: Key Aspects*, IX International Scientific and Practical Conference, February 19-20, Rome, Italy, p. 681. ISSN: 2709-4685. DOI: https://doi.org/10.51582/interconf.19-20.02.2024

Mustafayeva, A.M., Zeynalov, U.A., Bakhshiyeva, G.S., & Nasirova, S.S. (2023). Distance Education: New Realities and Future Prospects in the Global Education System. In *Proceedings of the Republican Scientific-Theoretical Conference Stages of Development in Education: Digitalization and Future Prospects*, dedicated to the 100th Anniversary of the National Leader Heydar Aliyev, Nakhchivan State University, May 4-5, pp. 143–150.

Musteen, M., Datta, D. K., & Francis, J. (2018). Creating intrapreneurs: The role of project-based learning in entrepreneurship education. *Journal of Small Business Management, 56*(S1), 131-146.

Myue, X. (2024). Assessing the impact of mentorship programs on student entrepreneurial success: A longitudinal study. *Journal of Entrepreneurship Education, 27*(5), 1–3.

Myue, X. (2024). Innovative pedagogical approaches in entrepreneurship education: Case studies and best practices. *Journal of Entrepreneurship Education, 27*(5), 1-3.

Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. *Academy of Management Learning & Education, 16*(2), 277–299.

National Erasmus+ Office in Ukraine. (2023). *VEHUB4YOU project events and results*.

National Erasmus+ Office in Ukraine. (2023, April 25). *Participation in the IV International Scientific and Practical Conference Economic Growth Imperatives in the Context of the Implementation of the Global Sustainable Development Goals within Erasmus+ VEHUB4YOU*. https://erasmusplus.org.ua/en/news/participation-in-the-iv-international-scientific-and-practical-conference-economic-growth-imperatives-in-the-context-of-the-implementation-of-the-global-sustainable-development-goals-within-the-er

National Qualifications Agency. (2022, August 22). *Onlain zakhid shchodo Yevropeiskoi ramky pidpryiemnytskoi kompetentnosti (EntreComp)* [Online event on the European Entrepreneurship Competence Framework (EntreComp)]. Retrieved from https://nqa.gov.ua/news/onlajn-zahid-sodo-evropejskoi-ramki-pidpriemnickoi-kompetentnosti-entrecomp/

Nazarenko, H. A. (2018). Formuvannia pidpryiemnytskoi svidomosti yak skladovoi profesiinoi kompetentnosti maibutnikh fakhivtsiv [Formation of entrepreneurial consciousness as a component of professional competence of future specialists]. *Visnyk Cherkaskoho universytetu. Seriia: Pedahohichni nauky, 5*, 89–95.

Neck, H. M., & Greene, P. G. (2011). Entrepreneurship Education: Known Worlds and New Frontiers. *Journal of Small Business Management, 49*(1), 55–70. https://doi.org/10.1111/j.1540-627X.2010.00314.x

Neck, H. M., Greene, P. G., & Brush, C. G. (2009). Teaching entrepreneurship: A practice-based approach. *Journal of Entrepreneurship Education, 12*, 1–24.

Neck, H. M., Greene, P. G., & Brush, C. G. (2014). *Teaching Entrepreneurship: A Practice-Based Approach*. Edward Elgar Publishing.

Nevmerzhytska, M., & Nevmerzhytska, S. (2025). *Knowledge valorization centers: Research of modern models*. Imperatives of Economic Growth in the Context of Sustainable Development Goals: Proceedings of the VI International Scientific-Practical Internet Conference, Kyiv, April 29, 2025.

Nevmerzhytska, S. (2025). *Academic startups as a form of knowledge valorization: Efficiency of support centers*. Imperatives of Economic Growth in the

Context of Sustainable Development Goals: Proceedings of the VI International Scientific-Practical Internet Conference, Kyiv, April 29, 2025.

Nevmerzhytska, S. M. (2025). *Innovative educational practices as a means of youth leadership development*. Innovative Ecosystem for the Reconstruction of Ukraine: Integration of Science, Education and Business, Proceedings of the International Scientific-Practical Conference, Kyiv, October 3, 2025.

Nevmerzhytska, S. M., & Tsalko, T. R. (2024). *Virtual exchange technologies as a component of modern teacher professional development*. Problems of Integration of Education, Science and Business in the Conditions of Globalization: Proceedings of the VI International Scientific-Practical Conference, Kyiv, October 4, 2024, 271–272.

Nguyen, B., Yu, X., Melewar, T. C., & Chen, J. (2021). Brand engagement, co-creation, and social media: Impact on brand equity in higher education. *Journal of Business Research, 126*, 761–772. https://doi.org/10.1016/j.jbusres.2019.12.020

Nguyen, N., & LeBlanc, G. (2001). Strategic brand management in higher education institutions. *Journal of Marketing for Higher Education, 10*(3), 21–39.

Nguyen, T. H., Le, T. T., & Pham, T. N. (2024). Digital competence of Vietnamese citizens: An application of DigComp framework and the role of individual factors. *Education and Information Technologies, 29*, 1–25.

Norman, D. A. (2013). *The design of everyday things* (Revised and expanded edition). Basic Books.

Nussbaum, M. C. (2011). *Creating capabilities: The human development approach*. Harvard University Press.

O'Dowd, R. (2015). The training and accreditation of teachers for virtual exchange: Current issues and future possibilities. *European Journal of Teacher Education, 41*(1), 1–15.

O'Dowd, R. (2018). From telecollaboration to virtual exchange: State-of-the-art and the role of UNICollaboration. *Journal of Virtual Exchange, 1*, 1–23. https://doi.org/10.14705/rpnet.2018.jve.1

O'Dowd, R. (2023). *Internationalising Higher Education through Virtual Exchange: Navigating the Shift from Physical to Online Collaboration*. Routledge.

O'Sullivan, H., Polkinghorne, M., Chapleo, C., & Cownie, F. (2024). Contemporary branding strategies for higher education. *Encyclopedia, 4*(3), 1292–1311. https://doi.org/10.3390/encyclopedia4030085

Oberländer, M., Beinicke, A., & Bipp, T. (2020). Digital competencies: A review of the literature and applications to the development of the workforce. *Computers & Education, 148*, 103752.

OECD (2021). The Digital Economy Outlook 2021. Paris: OECD Publishing. https://www.oecd.org/en/publications/oecd-digital-economy-outlook_f0b5c251-en.html (Accessed 12 Oct 2025)

OECD. (2015). *Entrepreneurship at a Glance 2015*. OECD Publishing.

OECD. (2019). *OECD-DAC criteria for evaluating development assistance*.

OECD. (2019). *Supporting Entrepreneurship and Innovation in Higher Education in Italy*. OECD Publishing.

OECD. (2021). Teachers and Leaders in Vocational Education and Training. OECD Publishing.

OECD. (2022). *Empowering Young Entrepreneurs in Rural Areas*. OECD Local Economic and Employment Development (LEED) Papers.

OECD. (2024). *Society at a Glance 2024: OECD Social Indicators*. Paris: OECD Publishing. DOI: https://doi.org/10.1787/918d8db3-en

Olena Zelenska Foundation. (2025, May 23). *The foundation presented research on professional expectations of teenagers in Ukraine*. National Police of Ukraine.

Olena Zelenska. (2023, May 12). *Gender equality should be not only in duties and responsibilities but also in opportunities*. Central Interregional Department of the State Labor Service.

On Ensuring Coordination in the Field of Innovative Development in the Republic of Azerbaijan.

On the Approval of the Criteria for the Definition of a Startup.

On the Approval of the First State Program on the Great Return to the Liberated Territories of the Republic of Azerbaijan.

Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization Studies, 28*(9), 1435–1448.

Osadchyi, V., Chemerys, H., Osadcha, K., Kruhlyk, V. S., Koniukhov, S., & Kiv, A. (2020). Conceptual model of learning based on the combined capabilities of augmented and virtual reality technology with adaptive learning systems. In O. Yu. Burov & A. E. Kiv (Eds.), *CEUR Workshop Proceedings* (Vol. 2731, pp. 328–340). CEUR-WS.org. Retrieved from http://eprints.mdpu.org.ua/id/eprint/10927/

Pane, J. F., Steiner, E. D., Baird, M. D., & Hamilton, L. S. (2017). Effects of personalized learning on students' learning outcomes. *Journal of Educational Psychology, 109*(6), 691–705.

Parrish, D. R., Williams, D. B., & McGregor, D. (2021). Virtual teams in higher education: Challenges and solutions. *Education and Information Technologies, 26*, 1-19.

Perets, E. A., et al. (2020). Student engagement and motivation in virtual learning. *Education Sciences, 10*(2), 45–59.

Piaget, J. (1950). *The psychology of intelligence*. Routledge.

Piaget, J. (1970). *The Science of Education and the Psychology of the Child*. Orion Press.

Pichik, K. V., Humenna, O. V., & Chovnyuk, L. Yu. (2020). *Virtual mobility as an innovative approach in learning*. Economic Journal Odesa Polytechnic University, 4(14), 42–52.

Pinar, M., Trapp, P., Girard, T., & Boyt, T. E. (2014). University brand equity: An empirical investigation of its dimensions and outcomes. *Journal of Marketing for Higher Education, 24*(1), 1–21. https://doi.org/10.1080/08841241.2014.973472

Pinar, M., Trapp, P., Girard, T., & Boyt, T. E. (2014). University brand equity: An empirical investigation of its dimensions. *International Journal of Educational Management, 28*(6), 616–634. https://doi.org/10.1108/IJEM-04-2013-0051

Pinto, R., Galán, G., & Palacios, A. (2021). Digital entrepreneurial competencies: A systematic literature review. *International Journal of Entrepreneurial Behavior & Research, 27*(3), 828–852.

Pittaway, L., & Cope, J. (2007). Entrepreneurship education: A systematic review of the evidence. *International Small Business Journal, 25*(5), 479–510.

Politis, D. (2005). The process of entrepreneurial learning: A conceptual framework. *Entrepreneurship Theory and Practice, 29*(4), 399–424.

Powell, W. W., & Grodal, S. (2021). Networks and innovation. In N. Phillips, G. Sewell, & D. S. Owen (Eds.), *The Oxford handbook of sociology, social theory, and organization studies* (updated ed., pp. 1–24). Oxford University Press.

Powell, W. W., & Grodal, S. (2021). *Networks of innovation and learning: Institutions and interactions*. Oxford University Press.

Presidential Decree of the Republic of Azerbaijan on Measures for Improving Management in the Fields of Digitalization, Innovation, High Technologies, and Communications.

Presidential Decree on the Approval of the State Program on the Development of Regions of the Republic of Azerbaijan for 2019–2023, January 29, 2019.

Problems of distance learning and how to solve them. (n.d.). Retrieved from https://osvita.ua/news/92506/

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. Simon & Schuster.

Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education. *Computers & Education, 147*, 103778.

Rae, D. (2007). Connecting enterprise and graduate employability: Challenges to the higher education culture and curriculum? *Education + Training, 49*(8/9), 605–619.

Rae, D. (2017). *Entrepreneurial learning: New perspectives in research, education and practice*. Routledge.

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education, 2*(3), 923–945.

Rasmussen, E., & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation, 26*(2), 185-194.

Ratten, V., & Jones, P. (2021). *COVID-19 and Entrepreneurship: Future Perspectives for Theory and Practice*. Routledge.

Ratten, V., & Jones, P. (2021). Entrepreneurship education: Time for a change in research direction? *Journal of Business Research, 134*, 557–560.

Ratten, V., & Usmanij, P. (2021). Entrepreneurship and the Sustainable Development Goals: The Role of Networks and Internationalization. *Journal of International Entrepreneurship, 19*(2), 175-181.

Ratten, V., & Usmanij, P. (2021). Entrepreneurship education: Time for a change in research direction? *Journal of Business Research, 134*, 557–560.

Ravindra Singh; Vimal Kumar, Sumanjeet Singh; Ajay Dwivedi; Sanjeev Kuma (2024) Measuring the impact of digital entrepreneurship training on entrepreneurial intention: the mediating role of entrepreneurial competencies r Journal of Work-Applied Management/ 16 (1): 142–163. https://doi.org/10.1108/JWAM-11-2022-0076 (Accessed 12 Oct 2025)

Resonanceglobal.com. (2024). What is Monitoring, Evaluation, and Learning (MEL)?

RISEBA University of Applied Sciences. (n.d.). *VEHUB4YOU (Erasmus+ project)*. https://riseba.lv/en/projects/vehub4you-erasmus

Rockstuhl, T., Seiler, S., Ang, S., Van Dyne, L., & Annen, H. (2011). Beyond general intelligence (IQ) and emotional intelligence (EQ): The role of cultural intelligence (CQ) on cross-border leadership effectiveness. *Journal of Social Issues, 67*(4), 825–840.

Rodrigues, A. L. (2023). Entrepreneurship Education Pedagogical Approaches in Higher Education. *Education Sciences, 13*(9), 940.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies, 47*(7), 1034–1047.

Rogers, P., & Lea, M. (2005). Social presence in distributed group environments: The role of social identity. *Behaviour & Information Technology, 24*(2), 151-158.

Romero, D., Ortiz, A., & Molina, A. (2010). The Virtual Enterprise from a Governance Perspective. In *DoCEIS 2010: Technological Innovation for Sustainability* (pp. 33–40). Springer.

Roschelle, J., Lester, J., & Fusco, J. (Eds.) (2020). *AI and the Future of Learning: Expert Panel Report* [Report]. Digital Promise.

Rubin, J. (2017). The collaborative online international learning network. *Internationalisation of Higher Education, 2*, 27–33.

Ruskovaara, E., & Pihkala, T. (2015). Entrepreneurship education in schools: Empirical evidence on the teacher's role. *Journal of Educational Research, 108*(3), 236–249.

Salas, E., Tannenbaum, S. I., Kraiger, K., & Smith-Jentsch, K. A. (2012). The science of training and development in organizations: What matters in practice. *Psychological Science in the Public Interest, 13*(2), 74–101.

Salnyk, I. V., & Siryk, E. P. (n.d.). Virtuality as a principle and technology of learning. Retrieved from http://ped-series.kpnu.edu.ua/article/view/34019

Sánchez, J., Salinas, A., & Harris, J. (2011). Education with ICT in South America: Chile and Uruguay. *Australasian Journal of Educational Technology, 27*(1), 98–111.

Sansone, G., Ghezzi, A., Landoni, P., & Rangone, A. (2024). Digital skills and entrepreneurial engagement among university students: Evidence from Italy. *IEEE Transactions on Engineering Management, 71*(1), 19-34.

Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review, 26*(2), 243–263. https://doi.org/10.5465/amr.2001.4378020

Saylor Academy. https://www.saylor.org/

Schroeder, J. E. (2020). *Visual branding: A semiotic approach*. Routledge.

Schroeder, J. E. (2024). Critical visual analysis of branding and identity. In A. B. Antorini & C. J. Fournier (Eds.), *Handbook of brand, culture and identity* (pp. 255–270). Edward Elgar.

Schumpeter, J. A. (1934). *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Harvard University Press.

Secundo, G., Mele, G., Vecchio, P. D., & Ndou, V. (2021). Digital skills development: Insights from the Italian context. *Education Sciences, 11*(7), 357.

Secundo, G., Meoli, M., Rippa, P., & Passiante, G. (2021). Digital transformation and entrepreneurship education: A systematic literature review. *Technological Forecasting and Social Change, 173*, 121089.

Secundo, G., Rippa, P., & Meoli, M. (2020). Digital transformation in entrepreneurship education centres: preliminary evidence from the Italian Contamination Labs network. *International Journal of Entrepreneurial Behavior & Research, 26*(7), 1589–1605.

Selwyn, N. (2019). *Should Robots Replace Teachers? AI and the Future of Education*. Polity Press.

Sen, A. (1999). *Development as freedom*. Oxford University Press.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review, 25*(1), 217-226.

Shapero, A., & Sokol, L. (1982). The Social Dimensions of Entrepreneurship. In C. A. Kent, D. L. Sexton, & K. H. Vesper (Eds.), *Encyclopedia of Entrepreneurship* (pp. 72–90). Prentice-Hall.

Shaposhnikov, K. S., & Zhavoronok, A. V. (2025). Digital Skills as a Factor of Labor Market Transformation in the European Union Countries. Problems of Modern Transformations. Series: Economics and Management, (18). https://doi.org/10.54929/2786-5738-2025-18-03-06 (Accessed 12 Oct 2025)

Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education, 55*(4), 1721–1731.

Shevchenko, A., Bilan, Y., & Yaroshevych, N. (2025). Barriers and Opportunities for Entrepreneurship Development in Ukraine: Towards a Sustainable and Resilient Economic Future. *Journal of Vasyl Stefanyk Precarpathian National University, 1*. https://journals.pnu.edu.ua/index.php/jpnu/article/view/9424

Shevchenko, A., Petrenko, V., & Sydorenko, L. (2025). Resilience and social impact: The new paradigm of Ukrainian entrepreneurship. In M. Z. Ivanov (Ed.), *Post-war economic reconstruction in Ukraine*. University of Kyiv Press.[1]

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1), 3–10.

Sikora, Ya. B., Yatsenko, O. I., & Pogrebnyak, M. G. (2024). Virtual reality as a tool for adaptive learning in a digital educational environment. *Academic Visions, (28)*. https://doi.org/10.5281/zenodo.10725643

Simmons, S. (2021). Institutionalization of experiential practices in entrepreneurship education. *Entrepreneurship Education, 4*(2), 101–119.

Skinner, B. F. (1953). *Science and Human Behavior*. Macmillan.

Slaouti, D., & Motteram, G. (2020). Virtual exchange as a transformative pedagogical tool. *Innovation in Language Learning and Teaching, 14*(1), 1–13.

Smachylo, I. V. (2023). The role of entrepreneurial education in fostering social stability during wartime. *Ukrainian Journal of Economics and Management, 7*(2), 45–58.

Smachylo, V. (2023). *Impact of the War on Entrepreneurship in Ukraine*. ResearchGate. https://www.researchgate.net/publication/381724188_Impact_of_the_War_on_Entrepreneurship_in_Ukraine

Small and Medium Business Development Agency of the Republic of Azerbaijan (KOBİA). (n.d.). Retrieved from https://smb.gov.az/az

Small and Medium Business Development Centers. (n.d.). Retrieved from https://kobim.az/

Sociological Group Rating. (2023, August 2). *Stavlennia molodi do vlasnoho biznesu: porivniannia Ukrainy ta YeS* [Attitudes of youth towards their own business: A comparison of Ukraine and the EU]. https://ratinggroup.ua/research/ukraine/stavlennya_molod_do_vlasnogo_b_znesu_por_vnyannya_ukra_ni_ta_s.html

Soja, E. W. (2010). *Seeking spatial justice*. University of Minnesota Press.

Sparkes, D., Schmidlin, K., & Hsu, M. (2019). Virtual learning environment for entrepreneurship: A conceptual model. *Proceedings of the 13th International Conference on Education and Information Systems, Technologies and Applications*.

Spitzberg, B. H., & Changnon, G. (2020). Conceptualizing Intercultural Competence. In D. K. Deardorff (Ed.), The SAGE Handbook of Intercultural Competence (pp. 2–52). Thousand Oaks, CA: Sage.

Stam, E. (2015). Entrepreneurial ecosystems and regional policy: A sympathetic critique. *European Planning Studies, 23*(9), 1759–1769.

Stam, E., & Spigel, B. (2016). Entrepreneurial ecosystems. In A. L. Carsrud & M. Brännback (Eds.), *Understanding the entrepreneurial mind* (pp. 236–260). Springer.

State Employment Center. (2025, February 28). *Pidsumky prohramy Vlasna Sprava dlia molodi stanom na liutyi 2025 roku* [Results of the Vlasna Sprava program for youth as of February 2025]. https://www.dcz.gov.ua/storinka/vlasna-sprava-results-2025

Steiner-Khamsi, G. (2004). *The global politics of educational borrowing and lending*. Teachers College Press.

St-Jean, É., & Audet, J. (2012). The role of mentoring in the learning development of the novice entrepreneur. *International Entrepreneurship and Management Journal, 8*(1), 119–140.

Stolze, A., & Sailer, K. (2021). Academic entrepreneurship ecosystems: A systematic literature review. *Journal of Technology Transfer, 46*, 1–27.

Stolze, A., & Sailer, K. (2021). Academic entrepreneurship ecosystems: A systematic literature review. *Journal of Technology Transfer, 46*, 1–27.

Strutynska O. (2020) Digital Skills And Competencies: Foreign Experience Of Eu Countries And Prospects For Ukraine. Physical and Mathematical Education.. Issue 3(25). Part 1. P. 94-102. DOI 10.31110/2413-1571-2020-025-3-015

Sun, J. C.-Y., & Chen, A. Y.-L. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research, 15*, 157–190.

Swan, K., Garrison, D. R., & Richardson, J. C. (2009). A constructivist approach to online learning: The Community of Inquiry framework. In C. R. Payne (Ed.), *Information Technology and Constructivism in Higher Education: Progressive Learning Frameworks* (pp. 43–57). IGI Global.

Swartz, S., & Luck, S. L., et al. (2020). Professional learning through collaborative online international learning. In *EDULEARN20 Proceedings*, 3951–3958.

Szanter, R., & Matuska, E. (2024). Development and certification of digital competences in European Union countries in project-based learning initiatives. *Journal of Modern Science, 56*(2), 371-396.

Talukder, S. C., Lakner, Z., & Temesi, Á. (2024). Development and State of the Art of Entrepreneurship Education: A Bibliometric Review. *Education Sciences*, *14*(3), 295. https://doi.org/10.3390/educsci14030295.

Tapscott, D., & Tapscott, A. (2016). *Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World*. Penguin.

Taras Shevchenko National University of Kyiv. (n.d.). *COIL programs*. KNU International Office.

Tavriya State Agrotechnological University. (2024). *Certificate of achievement: Professional Qualification Enhancement Program Use of Information and Communication Technologies in the Educational Process (VEHUB4YOU)* [PDF]. http://www.tsatu.edu.ua/et/wp-content/uploads/sites/33/vehub4you-yavorska.pdf

Taylor, D. W. (2016). Developing entrepreneurial behaviour: Facilitating entrepreneurial learning through peer and self-assessment. *Journal of Entrepreneurship Education, 19*(2), 1-12.

Tereshchuk, V. I., Ilchenko, A. M., & Semenyshyna, I. V. (2023). Innovative learning technologies in higher education institutions. *Academic Visions, (16).* https://doi.org/10.5281/zenodo.7639008

The concept of quality education. URL: https://osvita.ua/school/method/1342/ (Accessed 12 Oct 2025)

The Strategic Road Map for the Production and Processing of Agricultural Products in the Republic of Azerbaijan. (2016, December 6). Presidential Decree of the Republic of Azerbaijan. Retrieved from https://president.az

Thomas, J. W. (2000). A Review of Research on Project-Based Learning. The Autodesk Foundation.

TogetherLearning. (2024). Narrative Inquiry into the Challenges of Implementing XR Technologies in Education: Voices from Future Hub 2023.

Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development, 65*(3), 555–575.

Tsalco, T. R., & Nevmerzhytska, S. M. (2021, October 8). *Research on problems and development of recommendations for improving the educational process in the context of the pandemic.* In *Proceedings of the 3rd International Scientific and Practical Conference Problems of Integration of Education, Science and Business in the Context of Globalization* (pp. 67–68). Kyiv: KNUTD. https://er.knutd.edu.ua/bitstream/123456789/18896/1/PIONBUG_2021_P067-068.pdf

Tsalco, T., & Nevmerzhytska, S. (2023, October 6). *The use of virtual learning in education.* In *Proceedings of the 5th International Scientific and Practical Conference Problems of Integration of Education, Science and Business in the Context of Globalization* (pp. 214–216). Kyiv: KNUTD.

Tsalko T., Nevmerzhytska S. Cloud Technologies: Use in the Educational Process as a Way to High Management in Business. *Higher Economic - Social School in Ostroleka*. *SJ-Economics*. 2023. Vol. 50 № 3. DOI: https://doi.org/10.58246/sj-economics.v50i3.633 – URL: https://ojs.wsa.edu.pl/index.php/sj-economics/article/view/633

Tsalko T., Nevmerzhytska S. Implementation of cloud technologies in the education process of higher education institutions in Ukraine / *Social and economic aspects of internet services market development: monograph*; Edited by I. Tatomyr, V. Fedyshyn. Praha: OKTAN PRINT, 2021, 287 p. / pp. 250-262. DOI: https://doi.org/10.46489/saeaois-04

Tsalko T., Olshanska O., Nevmerzhytska S. Monitoring of Local Requirements, Needs and Expectations of Young People in Creating an International Network of Virtual Youth Business Hubs / *Modern Science – Moderni věda*. – Praha. – Česká republika, Nemoros. 2023. № 4. P. 53-65. – URL: https://sried.eu/modern-science-moderni-veda-%E2%84%96-4-2023/

Tsalko, T. R., & Nevmerzhytska, S. M. (2021). *Research of problems and development of recommendations for improving the educational process during the pandemic*. Proceedings of the III International Scientific-Practical Conference Problems of Integration of Education, Science and Business in the Conditions of Globalization, Kyiv, October 8, 2021, 67–68.

Tsalko, T., & Nevmerzhytska, S. (2021). *Implementation of cloud technologies in the education process of higher education institutions in Ukraine*. In I. Tatomyr & V. Fedyshyn (Eds.), Social and Economic Aspects of Internet Services Market Development (pp. 250–262). Prague: OKTAN PRINT.

Tsalko, T., & Nevmerzhytska, S. (2023). *Use of virtual learning in education*. Proceedings of the V International Scientific-Practical Conference Problems of Integration of Education, Science and Business in the Conditions of Globalization, Kyiv, October 6, 2023, 214–216.

Tsalko, T., & Nevmerzhytska, S. (2023, October 6). Using virtual learning in education. In O. V. Olshanska (Ed.), *Proceedings of the V International Scientific and Practical Conference Problems of Integration of Education, Science and Business in the Context of Globalization* (pp. 214–216). Kyiv: KNUTD. Retrieved from https://er.knutd.edu.ua/bitstream/123456789/25942/1/PIONBUG_2023_P214-216.pdf

Tsalko, T., Nevmerzhytska, S. (2023). *Cloud technologies: Use in the educational process as a way to high management in business*. SJ-Economics, 50(3).

Tsalko, T., Olshanska, O., & Nevmerzhytska, S. (2023). *Monitoring of local requirements, needs and expectations of young people in creating an international network of virtual youth business hubs*. Modern Science – Moderni věda, 4, 53–65.

Tutunea, G. (2021). *Acquiring intercultural communicative competence through virtual exchange*. Acta Universitatis Sapientiae, Philologica, 13(3), 44–61.

Ukrainian Startup Fund. (2020, August 6). *V ukrainskykh universytetakh z'iavytsia kurs z innovatsiinoho pidpryiemnytstva* [A course on innovative entrepreneurship will appear in Ukrainian universities]. Retrieved from https://usf.com.ua/v-ukrainskih-universitetah-z-yavitsya-kurs-z-innovacijnogo-pidpriiemnictva/

Ukrainian Veterans Foundation. (2025). *Analysis of grant application rejections for the veteran component of the eRobota program*. UVF.[1]

UNESCO. (2020). Education: From Disruption to Recovery. UNESCO.

UNESCO. (2022). Global Citizenship Education: Preparing Learners for the Challenges of the 21st Century. Paris: UNESCO Publishing.

UNESCO. (2023). *Global Education Monitoring Report 2023*. UNESCO.

UNESCO. (2024). The Digital Competence Framework for Citizens 2.2. SDG4 Knowledge Hub.

UNESCO. (n.d.). *Inclusion in education: Leaving no learner behind*.

UNESCO-IBE Activities Report 2023.

United Nations Development Programme. (2003). *Osvitnia polityka ta osvita: Zvit za rezultatamy proektu PROON v Ukraini* [Educational policy and education: Report on the results of the UNDP project in Ukraine]. UNDP Publishing.

United Nations Development Programme. (n.d.). *Sustainable development goals*. UNDP Ukraine.

University of Foggia. (2023). *BANNER VEHUB4YOU* [PDF file]. Retrieved from https://www.unifg.it/sites/default/files/2023-06/BANNER%20VEHUB4YOU%20%281%29%20%281%29.pdf

University of Foggia. (n.d.). *Virtual Youth Business Hubs International Network – VEHUB4YOU (Erasmus+ project)*. https://www.unifg.it/it/internazionale/cooperazione-internazionale/progetti-erasmus/virtual-youth-business-hubs-

international-network-vehub4you
VEHUB4YOU. (n.d.). *Official website*. https://www.vehub4you.com

Upwork. (2020). Freelance Forward Economics Report https://www.upwork.com/press/releases/freelance-forward-economics-report?utm_source=chatgpt.com

Varnalii, Z. S. (2006). *Osnovy pidpryiemnytstva* [Fundamentals of entrepreneurship] (2nd ed.). Znannia-Pres.

Vasilyeva, T. A., & Kotenko, S. I. (Eds.). (2023). *Problems and prospects of online education development: Monograph.* Sumy: Sumy State University.

Veerasamy, R., & Nair, S. (2020). Digital marketing competencies and performance of small businesses in South Africa. *Journal of Small Business and Enterprise Development, 27*(4), 531–552.

VEHUB4YOU Consortium. (2024). Pilot evaluation report. Unpublished internal document.

VEHUB4YOU. (n.d.). *Instagram page* https://www.instagram. com/vehub4you

VEHUB4YOU. (n.d.). *Official project materials, portal pages, and event documentation*.

VEHUB4YOU. (n.d.). *Partners page*. https://www.vehub4you.com/s-projects-side-by-side

VEHUB4YOU. (n.d.). *Professional development programme*. https://www.vehub4you.com/professional-development-programme-1

VEHUB4YOU. (n.d.). *VEHUB4YOU | Educational Project Funded By The European Commission*. Retrieved from https://www.vehub4you.com/

VEHUB4YOU. (n.d.). *YouTube channel*. https://www.youtube.com/@VEHUB4YOU

Virtual Youth Business Hubs International Network. (n.d.). Retrieved from https://www.vehub4you.com/

Voronkova, T. E. (2024). *Kontseptualni osnovy formuvannia «pidpryiemnytskoho universytetu»* [Conceptual foundations of the formation of the entrepreneurial university]. DSpace KNEU. https://ir.kneu.edu.ua/bitstreams/5cc4293b-b1de-41be-aa65-41f75b3330c0/download

Vuorikari, R., Kluzer, S. and Punie, Y., D (2022) The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes, EUR 31006 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-

76-48882-8, doi:10.2760/115376, JRC128415.

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens. Publications Office of the European Union.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

W3C. (2018). Web Content Accessibility Guidelines (WCAG) 2.1.

Wang, Y., Li, Y., & Li, X. (2021). Understanding the impact of social capital on entrepreneurship: A review and future directions. *Frontiers in Psychology, 12*, 687205.

Warhuus, J. P., Blenker, P., & Elmholdt, S. T. (2017). Team learning in entrepreneurship education: The role of self-regulated learning strategies. *Education + Training, 59*(7/8), 765-779.

Welsha, D. H., Tullar, W. L., & Nemati, H. (2016). Entrepreneurship education: Process, method, or both? *Journal of Innovation & Knowledge, 1*(3), 125-132.

Wenninger, A. (2020). Assessment in entrepreneurship education: A review of the literature. *Education + Training, 62*(7/8), 767–783.

Williamson, B., Eynon, R., & Potter, J. (2022). The platformization of education. *Learning, Media and Technology, 47*(1), 1–12.

Wing, J. M. (2006). Computational thinking. *Communications of the ACM, 49*(3), 33–35.

World Economic Forum. (2020). *The Future of Jobs Report 2020*. Geneva: WEF.

Yaping, X., et al. (2023). University brand: A systematic literature review. *Journal of Marketing for Higher Education*. https://doi.org/10.1080/08841241.2023.10279816

Yıldırım, D., & Adem, Ö. (2021). *Effect of Early Economy Education and Financial Socialization on Financial Literacy Level. Afyon Kocatepe University Journal of Social Sciences,* 23(2), 694–706.

Yıldırım, T. (2019). *Students' Employability and Information Literacy Skills: The Case of Hacettepe University.* PhD Thesis, Hacettepe University, Institute of Social Sciences, Department of Information and Records Management. Ankara.

Zasidannya Rady z prav lyudini, gendernoyi rivnosti ta riznomanittya. (2024, July 18). *Meeting of the Council on Human Rights, Gender Equality and Diversity held at the initiative of the First Lady Olena Zelenska*. Ministry of Health of Ukraine.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher

education. *International Journal of Educational Technology in Higher Education, 16*(1), 1–27.

Zhang, M., Xu, H. & Chang, J. (2024). Mapping of Scientific Production on Entrepreneurship Education: A Bibliometric Analysis of a Decade. *International Journal of Learning, Teaching and Educational Research*. doi: 68-93. 10.26803/.23.2.4.

Zhao, Y. (2020). COVID-19 as a Catalyst for Educational Change. *Prospects*, 49(1), 29–33.

Zhao, Y. (2021). Digital competence in higher education research: A systematic literature review. *Computers & Education, 168*, 104212.

Zhu, X., Wang, Y., & Liu, M. (2022). Effectiveness of virtual team learning in entrepreneurship education: A survey study. *Frontiers in Psychology, 13*, 8968245.

Ziker, C., Truman, B., & Dodds, H. (2021). Cross Reality (XR): Challenges and Opportunities Across the Spectrum. In J. Ryoo & K. Winkelmann (Eds.), *Innovative Learning Environments in STEM Higher Education* (pp. 55–77). *SpringerBriefs in Statistics*.

AUTHORS AND AFFILIATIONS

Ahmadova, Samira - Head, International Cooperation Office; Mingachevir State University; ORCID: 0009-0004-8853-8020.

Bebko, Svitlana - Doctor of Science in Economics, Professor; Professor, Department of Marketing, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0002-0687-3801.

Bondarenko, Svitlana - Doctor of Science in Economics, Professor; Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0001-7183-1395.

Bugas, Natalia - PhD in Economics, Associate Professor; Associate Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0002-5858-0285.

Cherniavska, Olena - D.Sc., Professor; DiTELC Switzerland - Swiss Center of Excellence in Digital Transformation and Ecosystem Leadership, Zurich, Switzerland; ORCID: 0000-0001-9819-578X.

Cherniavska, Oleksandra - PhD Candidate; Department of Management, Kyiv National University of Technologies and Design, Kyiv, Ukraine; Director, Kyiv Education, Training and Youth Centre (KETY), Kyiv, Ukraine; ORCID: 0000-0002-9769-4867.

Gagliardi, Anna Roberta - PhD in Translational Medicine and Healthcare Systems Management, Research Fellow; Department of Engineering, LUM University, Casamassima (Bari), Italy; ORCID: 0000-0002-5931-283X.

Hryhorevska, Olena - PhD in Economics, Associate Professor; Associate Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0001-8279-3523.

Husuyev, Babak - Lecturer; Mingachevir State University; ORCID: 0000-0001-9315-9608.

Jalil, Farah Jabbar qizi - Professor; Head, Department of Pedagogy and Psychology, Mingachevir State University; ORCID: 0000-0001-6894-4401.

Kalashov, Arif - Lecturer; Department of Economics, Mingachevir State University; ORCID: 0000-0003-2632-9819.

Karimli, Gunel - Lecturer; Department of Business and Management, Mingachevir State University; ORCID: 0000-0001-7424-6108.

Kasych, Alla - Doctor of Economics, Professor; Vice-Rector for Scientific and Pedagogical (Educational) Activity; Head, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0001-7019-1541.

Magliocca, Pierpaolo - Associate Professor; Department of Social Sciences, University of Foggia, Italy; ORCID: 0000-0002-4954-1495.

Mustafayeva, Aida - PhD in Technical Sciences, Associate Professor; Head, Department of Information Technologies, Mingachevir State University; Doctoral Student, Institute of Control Systems; ORCID: 0000-0003-0801-5605.

Nevmerzhytska, Svitlana - PhD in Economics, Associate Professor; Associate Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0001-5392-9030.

Olshanska, Olexandra - Doctor of Science in Economics, Professor; Acting Rector, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0003-1535-7742.

Rasulov, Zaur - Senior Lecturer; Department of Business and Management, Mingachevir State University; ORCID: 0000-0003-0186-9819.

Shkoda, Mariana - Doctor of Science in Economics, Professor; Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine.

Tsalko, Tetiana - PhD in Economics, Associate Professor; Associate Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0002-4609-8846.

Vartanova, Olena - Doctor of Science in Economics, Professor; Professor, Department of Management, Kyiv National University of Technologies and Design, Ukraine; ORCID: 0000-0002-8706-6437.

Verdiyeva, Ulviyya Mahammadali qizi - Lecturer; Department of Pedagogy and Psychology, Mingachevir State University; ORCID: 0000-0003-2617-7456.

Yarish, Olena - PhD in Economics, Associate Professor; Head, Department of Finance and Banking, Poltava University of Economics and Trade, Ukraine; ORCID: 0000-0002-5693-4852.