From Needs to Action: Local Skill Demands and Adaptive Learning Strategies for the European Virtual Hub for Education and Adaptation in Emergencies

REPORT FROM THE WORKING GROUP
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Skills Enrichment for Adaptive Leadership

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Edited by:
Prof. Dr. Snezana Bilic, International Balkan University
Skopje, North Macedonia
sbilic@ibu.edu.mk

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3. Warsaw University of Technology (WUT), Poland
4. Kyiv National University of Technologies and Design (KNUTD), Ukraine
5. Mingachevir State University (MSU), Azerbaijan
6. Institute For Social and Economic Initiatives (ISEI), Ukraine
7. Kyiv Education, Training and Youth Centre (KETY), Ukraine
8. DiTELC Switzerland - Swiss Center of Excellence in Digital Transformation and Ecosystem Leadership, Switzerland

Executive Summary

This report presents a forward-looking synthesis of findings within the Erasmus + Virtual Exchange project **SEAL-NR** (Skills Enrichment for Adaptive Leadership in the New Reality). It reflects the collaborative efforts of partner institutions from North Macedonia, Ukraine, Poland, Latvia and Switzerland in identifying **transformative strategies for digital, inclusive, and future-ready education**.

Section 1 outlines the **evolution and strategic role of Virtual Exchange (VE)** in modern education. As we transition into the Web 4.0 era, VE is no longer merely a supplemental activity but a pedagogical infrastructure enabling **intercultural dialogue, collaborative learning, and digitally mediated engagement**. With examples from international best practices, this section emphasizes the potential that VE have for bridging cultural divides, and equipping learners with critical global competencies.

Section 2 highlights the **priority of 21st-century soft skills** identified across Ukraine and Azerbaijan. Drawing on local surveys, the section showcases the most demanded skills among youth such as c**ritical thinking, digital fluency, entrepreneurship, teamwork, media literacy, and adaptability**, as foundational skills not only for academic achievement but also for economic empowerment and social mobility of students and youth.

Section 3 presents **practical responses to the challenge of migrant and refugee adaptation**, with particular attention to **Latvia's national model**, as EU member state, for integrating displaced persons into educational system and society. These experiences illustrate how tailored support mechanisms, psycho-social services, and inclusive curricula contribute to long-term resilience and participation.

The final section, Section 4, introduces the **European Virtual Hub for Education and Adaptation in Emergencies**, a key outcome of the SEAL-NR project. Designed to deliver hybrid, multilingual, and skill-focused training, the Hub aims to reach **over 2,000 youth and 250 facilitators** during project period, fostering cross-border collaboration, digital entrepreneurship, and psychosocial adaptation. Its strategic framework is grounded in low-barrier access, interoperability, and alignment with the needs of structurally underserved populations.

Overall, this report offers a **forward-thinking approach in transforming** education into contexts of crisis, and uncertainty, thereby laying the groundwork for more **resilient, inclusive, and adaptive learning ecosystems** across Europe and beyond.

INTRODUCTION

The evolving educational and employment landscapes of Europe and the Eastern Partnership region demand innovative responses to the emerging needs of youth.
This report serves as a comprehensive monitoring document developed within the framework of the SEAL-NR project, aiming to assess and interpret the local requirements, expectations, and developmental gaps among young people and facilitators involved in VE and skills-based education. With an increasing need for adaptable learning systems and digital collaboration, this report provides critical insights into the core competencies required for future readiness, particularly 21st-century soft skills, digital fluency, and intercultural communication.

Report draws on localized data collection, national partner feedback, and comparative analysis across participating countries to present an informed overview of how youth perceive and prioritize their skill development in a post-pandemic, digitally connected, and crisis-impacted environment.

The findings in this report inform the design of targeted training programs, platform functionalities, and learning methodologies that will be implemented in the European Virtual Hub for Education and Adaptation in Emergencies, established in Kyiv, Ukraine. Additionally, this Report provides the case of Latvian experience in social adaptation of migrants and displaced persons.

As such, the report not only highlights present challenges but also provides strategic input for designing inclusive, skills-based, and adaptive educational initiatives for the turbulent years ahead.

"The future belongs to those who learn more skills and combine them in creative ways."

- Robert Greene

1. Virtual Exchange Practices: Global Experience, Educational Relevance, and Importance for Modern Education During Transition Toward Web 4.0 (New Reality)

Prof., Dr. Sc. Olena Cherniavska,
DiTELC Switzerland
Swiss Center of Excellence in Digital Transformation and Ecosystem Leadership, Zurich, Switzerland
helenacherniavska@gmail.com

This report provides a comprehensive analysis of VE in modern education, with a particular focus on its intersection with the transition to Web 4.0 (New Reality). The study traces the historical evolution of VE, from its origins in the mid-20th century to its current state, as a mainstream educational practice. It examines the various methodologies and pedagogical frameworks that have been developed to support VE, as well as the platforms and tools that are used to facilitate it. The study also provides an overview of the current state of VE, including leading institutions and programs, as well as case studies of real-world implementations. It discusses the challenges and barriers to the adoption of Web 4.0 to enable VE, as well as the opportunities that it presents. The report concludes with a forward-looking analysis of the future of VE and provides actionable recommendations for educational institutions that are looking to embrace this innovative pedagogical approach.

VE as a pedagogical concept, now widely acknowledged across the international academic landscape, emerges not merely as a supplementary method to traditional or online education but as a systemic framework for the co-construction of knowledge in transnational, digitally mediated environments. As Web 4.0 begins to redefine the grammar of connectivity, knowledge production, and learner agency, VE reveals itself as a crucial infrastructural innovation within higher education, particularly in its capacity to reconfigure intercultural understanding, digital literacies, and institutional internationalization.

Rooted in the communicative turn in education and further galvanized by globalization, VE positions itself at the intersection of epistemic inclusion, cognitive multiplicity, and digitally scaffolded collaboration. Its foundational principle is the orchestration of sustained, guided, curriculum-embedded engagements between geographically and culturally diverse cohorts of learners. Within this framing, VE is not reducible to MOOCs or general online learning; rather, it represents pedagogical grammar based on reciprocity, joint task execution, and intercultural competence.

This report is dedicated to a comprehensive synthesis of global VE practices, their historical trajectories, and theoretical innovations, culminating in an anticipatory analysis of VE's transition toward Web 4.0 paradigms and new reality of leadership. We engage with both international scholarship and contributions by Erasmus+ VE

projects, whose empirical and conceptual work foregrounds VE as a vector of educational transformation in emergent digital societies.

Scholarly definitions of VE converge on three central tenets: curriculum integration, intercultural reciprocity, and educator-guided collaboration. O'Dowd (2018) emphasizes VE as an intentional and pedagogically mediated practice. It entails not just communication but the co-development of assignments, reflections, and intercultural understanding between learners embedded in differing academic, linguistic, and national contexts.

The distinction between VE and generic online education lies in four specific features (Scherer Bassani & Buchem, 2019; Hrebackova, 2019):

- Embedding VE within formal curricula and institutional partnerships
- Prioritizing synchronous and asynchronous task-based interaction
- Explicit focus on intercultural communicative competence (ICC)
- Facilitation by trained educators, not ad hoc interactions

The roots of VE can be traced back to the mid-20th century, with the rise of international Pen Pal programs. These programs, which were often facilitated by schools and other educational organizations, provided young people with the opportunity to connect with their peers in other countries and learn about their cultures. While these early programs were limited by the technology of the time, they laid the groundwork for the development of VE. They demonstrated the power of cross-cultural communication to promote understanding and empathy, and they helped to create a generation of young people who were more open to the world. In the 1980s, with the advent of the internet, a new form of VE began to emerge. This new form, which came to be known as "telecollaboration," used email and other early internet technologies to connect students from different countries for collaborative learning projects. An important early telecollaboration project was iEARN (International Education and Resource Network), which was established in 1994. iEARN is a non-profit organization that facilitates online project-based learning and VE programs for students in over 100 countries.

The 1990s and 2000s saw the rapid growth of the internet and the development of new technologies that made it easier and more affordable to connect with people around the world. This led to a boom in the field of VE, as more and more educators began to see the potential of this innovative pedagogical approach. During this time, a few new models and approaches to VE were developed. One of the most influential of these was the Cultura model, which was developed at MIT University in USA in 1997. The Cultura model provides a structured framework for cross-cultural comparison and analysis through the exchange of cultural materials and online discussions. Another important development during this time was the rise of facilitated dialogue. This model, which was pioneered by organizations like Soliya, brings together small groups of students from different cultures for facilitated discussions on sensitive or controversial topics. The goal is to promote mutual understanding and empathy.

The development of Web 2.0 technologies, such as video conferencing, social media, and virtual worlds, also had a major impact on the field of VE. These technologies made it possible to create more immersive and engaging learning experiences, and they opened new possibilities for collaboration and communication.

In recent years, the field of VE has continued to grow and evolve. It has moved from being a niche activity to a mainstream educational practice, and it is now being used by educators at all levels of education, from K-12 to higher education. Several factors have contributed to the maturation of the field. One of the most important is the growing recognition of the importance of global competencies in the 21st century. As the world becomes more interconnected, it is more important than ever for students to have the skills and knowledge they need to succeed in a globalized world.

Another important factor is the growing body of research that demonstrates the effectiveness of VE. This research has shown that VE can lead to a wide range of positive learning outcomes, including improved language skills, increased intercultural competence, and enhanced digital literacy. The COVID-19 pandemic has also had a major impact on the field of VE. As schools and universities around the world were forced to close their doors, many educators turned to VE, as a way to provide their students with international experiences. This has led to a surge in interest in VE, and it has helped to accelerate the adoption of this innovative pedagogical approach.

Today, the field of VE is more vibrant and dynamic than ever before. There are a wide variety of models and approaches to VE, and there are a growing number of platforms and tools that are being used to facilitate it. As the world becomes more interconnected and as technology continues to evolve, the field of VE is poised for even greater growth in the years to come.

The evolution of VE in scholarly discourse reveals five intertwined phases, each shaped by technological affordances and evolving pedagogical paradigms:

1. The E-Tandem and Email Era (1990s)

VE's earliest manifestations were grounded in e-tandem exchanges, structured around asynchronous email correspondence for language practice. Despite their simplicity, these projects established essential precedents: bilateral student collaboration, textual reflection, and guided exploration of cultural differences (O'Dowd, 2018; Luna & Schaefer, 2018).

2. Telecollaboration and Synchronous Interaction (2000s)

The late 1990s witnessed the rise of telecollaboration, incorporating real-time communication tools—such as videoconferencing and chat—into structured, curriculum-based interactions. This period marks the beginning of reflective pedagogy within VE, emphasizing ICC development and sustained engagement (Hrebackova, 2019).

3. Institutionalization and Diversification (2010s)

The third phase involved mainstreaming VE via frameworks such as COIL and Erasmus+ Virtual Exchange. These models diversified formats: asynchronous forums, synchronous dialogues, and blended designs. Subject-

specific applications emerged across business, humanities, and STEM, with formal credit allocation and multi-institutional assessment mechanisms (Helm et al., 2023; Scherer Bassani & Buchem, 2019).

4. Policy and Community Scaling (2020s)

UNICollaboration's formation and the strategic shift in Erasmus+ toward KA3 policy-supporting actions signify the embedding of VE into regional education policy. VE is increasingly conceptualized not as a teaching method but a strategic modality for educational equality, civic competence, and digital readiness (O'Dowd, 2022; Garcés & O'Dowd, 2020).

5. Emergent techno-epistemic regime of Web 4.0 (2023+)

The emergent era of Web 4.0—characterized by intelligent interoperability, immersive environments, and decentralized architectures, marks a paradigmatic shift in how VE is conceived and operationalized. Defined by the integration of artificial intelligence, semantic metadata, and XR technologies, Web 4.0 repositions VE as a semantic infrastructure capable of anticipating learner needs, enabling immersive co-presence, and granting credential recognition through decentralized systems. In this context, VE transcends its role as a pedagogical format and emerges as a modular infrastructure of global digital learning, equity promotion, and civic orchestration (Cherniavska et al., 2023).

Now, we are on the cusp of another major evolution: the rise of Web 4.0. Web 4.0, also known as the "Intelligent Web" or the "Symbiotic Web," is a new era of the internet that is characterized by intelligence, interactivity, immersion, decentralization, and ubiquity. It is a web that is seamlessly integrated into our daily lives, and it is a web that is able to understand and anticipate our needs. The key to Web 4.0 is artificial intelligence (AI). AI will be the driving force behind the Intelligent Web, and it will be used to create more personalized, adaptive, and engaging online experiences.

Web 4.0 is not a single technology, but rather a collection of technologies that are coming together to create a new and more powerful web. Some of the key technologies of Web 4.0 include:

• **Artificial Intelligence (AI) and Machine Learning**: AI and machine learning are at the heart of Web 4.0. These technologies will be used to create intelligent systems that can learn from data, understand natural language, and make decisions.

• **Blockchain**: Blockchain is a distributed ledger technology that provides a secure and transparent way to store and manage data. It will be used to create a more decentralized web where users have greater control over their data.

• **Internet of Things (IoT)**: The IoT is a network of physical devices, vehicles, home appliances, and other items that are embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. It will be used to create a more ubiquitous web that is seamlessly integrated into our environment.

• **Extended Reality (XR)**: XR is an umbrella term that covers virtual reality (VR), augmented reality (AR), and mixed reality (MR). These technologies will be used to create more immersive and engaging online experiences.

• **Edge Computing**: Edge computing is a distributed computing paradigm that brings computation and data storage closer to the sources of data. This is expected to improve response times and save bandwidth.

• **Natural Language Processing (NLP)**: NLP is a field of AI that deals with the interaction between computers and humans using natural language. It will be used to create more natural and intuitive user interfaces.

Web 4.0 will have a profound impact on all aspects of our society, including education. It will lead to a paradigm shift in the way we learn, teach, and think about education.

Some of the keyways that Web 4.0 will transform education include:

• **Personalized Learning**: Web 4.0 will make it possible to create truly personalized learning experiences for every student. AI-powered systems will be able to track student progress, identify their strengths and weaknesses, and provide them with the resources and support they need to succeed.

• **Immersive Learning**: XR technologies will make it possible to create immersive learning experiences that are more engaging and effective than traditional classroom instruction. Students will be able to visit virtual worlds, conduct virtual experiments, and interact with virtual objects.

• **Collaborative Learning**: Web 4.0 will make it easier for students to collaborate with each other on projects and assignments. Social VR platforms and other collaborative tools will allow students to work together in real time, regardless of their location.

• **Lifelong Learning**: Web 4.0 will make it possible for people to learn new things throughout their lives. Online learning platforms and other educational resources will be available to everyone, everywhere, at any time.

A number of emerging platforms and tools are already being used to integrate Web 4.0 technologies into VE programs. Some of the most promising of these include:

• **Social VR Platforms**: Platforms like VRChat and AltspaceVR are being used to create immersive social spaces where students can interact with each other in virtual environments. These platforms can be used to host a variety of VE activities, such as language exchanges, cultural events, and collaborative projects.

• **AI-Powered Language Learning Apps**: Apps like Duolingo and Babbel are using AI to provide personalized language learning experiences. These apps can be used to supplement traditional language instruction and to provide students with additional opportunities to practice their language skills.

• **Virtual Tour Platforms**: Platforms like Google Arts & Culture and Matterport are being used to create virtual tours of museums, historical sites, and other locations. These platforms can be used to provide students with a more immersive and engaging way to learn about different cultures and places.

• **Immersive Learning Hubs**: Institutions like the Roosevelt Institute are creating immersive learning hubs that provide students with access to a variety of VR and AR experiences. These hubs can be used to support a wide range of VE activities, from virtual field trips to collaborative design projects.

The integration of Web 4.0 technologies into VE requires a new approach to pedagogy. The traditional model of online learning, which is often based on the transmission of information from the teacher to the student, is not well-suited for the immersive and intelligent learning environments of the future. Instead, educators need to adopt a more student-centered and collaborative approach to pedagogy. They need to create learning experiences that are active, engaging, and authentic. And they need to provide students with the opportunity to take ownership of their learning and to collaborate with their peers on projects that are meaningful to them.

Some of the key pedagogical principles for designing immersive and intelligent learning include:

• **Presence**: As mentioned earlier, presence is a key factor in the success of any virtual experience. Educators need to design learning experiences that create a strong sense of presence and that make students feel like they are actually in the same room with their international partners.

• **Agency**: Students need to have a sense of agency in their learning. They need to be able to make choices about what they learn, how they learn, and how they demonstrate their learning.

• **Adaptivity**: The learning environment needs to be adapted to the individual needs of each student. It needs to be able to provide students with the support and resources they need to succeed, regardless of their prior knowledge or experience.

• **Intelligence**: The learning environment needs to be intelligent. It needs to be able to track student progress, identify their strengths and weaknesses, and provide them with real-time feedback and support.

The pedagogy of the new reality will be a pedagogy of co-creation. It will be a pedagogy in which teachers and students work together to create learning experiences that are meaningful, engaging, and effective.

The field of VE is still in its early stages, but there are already several institutions and organizations that are leading the way. These pioneers are developing innovative new models and approaches to VE, and they are helping to create a more just, equitable, and peaceful world through the power of education.

Some of the leading institutions and programs in the field of VE include:

• **The Stevens Initiative**: The Stevens Initiative is a public-private partnership that is working to expand the field of VE. It provides funding and support to a wide range of VE programs, and it is helping to build a community of practice around this innovative pedagogical approach.

• **The SUNY COIL Center**: The SUNY COIL Center is a leader in the field of Collaborative Online International Learning. It provides training and support to faculty who want to develop VE courses, and it has developed a model for VE that has been adopted by institutions around the world.

• **IREX**: IREX is an international nonprofit organization that is committed to promoting positive social change. It implements a variety of VE programs, including the "Global Solutions" program, which brings together students from different countries to work on collaborative projects that address real-world problems.

• **Soliya**: Soliya is a nonprofit organization that specializes in facilitated dialogue. It has developed a unique model for VE that brings together students from different cultures for constructive conversations on sensitive or controversial topics.

• **UNICollaboration**: UNICollaboration is a platform that connects educators who are interested in VE. It provides them with the tools and resources they need to collaborate on the design and implementation of VE programs.

• **eTwinning**: eTwinning is a European Commission initiative that connects schools across Europe. It provides a safe and secure platform for online collaboration, and it has helped to create a vibrant community of practice around VE.

In addition to these leading institutions and programs, there are many other organizations and individuals who are doing important work in the field of VE. These include universities, colleges, K-12 schools, and non-profit organizations.

While the integration of Web 4.0 technologies into VE is still in its early stages, there are already several innovative case studies that demonstrate the potential of this powerful combination. Here are a few examples:

• **The Global Solutions Program**: The Global Solutions program, which is implemented by IREX, is a project-based VE program that brings together students from different countries to work on collaborative projects that address real-world problems. The program uses a variety of Web 2.0 and Web 3.0 technologies to facilitate communication and collaboration, and it is exploring the use of Web 4.0 technologies, such as AI and VR, to create more immersive and engaging learning experiences.

• **The Business & Culture Program at the University of Michigan**: The Business & Culture program at the University of Michigan is a VE program that connects students from the Ross School of Business with their peers at universities in Egypt, Lebanon, and Libya. The program uses a variety of synchronous and asynchronous communication tools to facilitate interaction, and it has been shown to have a significant, positive effect on participants' knowledge of other cultures and their ability to see from others' perspectives.

• **The Immersive Learning Hub at the Roosevelt Institute**: The Immersive Learning Hub at the Roosevelt Institute is a state-of-the-art facility that provides students with access to a variety of VR and AR experiences. The hub is being used to support a wide range of VE activities, from virtual field trips to collaborative design projects.

These are just a few examples of the many innovative case studies that are emerging in the field of Web 4.0-enabled VE. As technologies continue to evolve, we can expect to see even more exciting and transformative applications of this powerful pedagogical approach. A growing body of research that demonstrates the effectiveness of VE. This research has shown that VE can lead to a wide range of positive learning outcomes, including:

• **Improved Language Skills**: VE provides an authentic opportunity for students to practice their language skills with native speakers. Research has shown that students who participate in VE programs make significant gains in their language proficiency.

• **Increased Intercultural Competence**: VE can help students to develop a greater understanding and appreciation of cultural differences. Research has shown that students who participate in VE programs are more likely to have a positive attitude towards people from other cultures and to be more open to new experiences.

• **Enhanced Digital Literacy**: VE requires students to use a variety of digital tools and technologies. This can help them to develop their digital literacy skills, which are essential for success in the 21st century.

• **Improved Communication and Collaboration Skills**: VE provides students with the opportunity to work on collaborative projects with their international partners. This can help them to develop their communication and collaboration skills, which are also essential for success in the 21st century.

• **Increased Global Awareness**: VE can help students to develop a more global perspective and a greater understanding of global issues. Research has shown that students who participate in VE programs are more likely to be interested in world affairs and to be engaged in their communities.

The evidence is clear: VE is a powerful pedagogical approach that can have a transformative impact on student learning. As the field continues to evolve and as new technologies emerge, we can expect to see even greater benefits from this innovative approach to education.

Despite the many benefits of VE, there are a few challenges and barriers that need to be addressed in order to promote its widespread adoption. These include:

• **Technological Barriers**: Lack of access to technology, reliable internet, and technical support can be a major barrier to participation in VE, especially for students in developing countries.

• **Pedagogical Challenges**: Designing and implementing effective VE programs requires a different set of pedagogical skills than traditional face-to-face teaching. Many educators are not familiar with the best practices for online teaching and learning, and they may not have the time or resources to develop the necessary skills.

• **Administrative Hurdles**: Administrative hurdles, such as differences in academic calendars, time zones, and institutional policies, can make it difficult to implement VE programs.

• **Lack of Institutional Support**: Lack of institutional support, including funding, resources, and recognition for faculty who participate in VE, can be a major barrier to adoption.

• **Interoperability Issues**: As with telehealth, interoperability issues between different platforms and systems can be a significant challenge.

Despite the challenges, the future of VE is bright. The convergence of Web 4.0 technologies and VE presents several exciting opportunities to create more immersive, engaging, and effective learning experiences.

Some of the key opportunities include:

• **Personalized Learning**: AI-powered platforms can be used to create personalized learning paths for students, providing them with the resources and support they need to succeed.

• **Immersive Experiences**: VR and AR can be used to transport students to virtual environments, allowing them to experience different cultures and collaborate on projects in a more realistic and engaging way.

• **Intelligent Tutoring**: AI-powered tutors can be used to provide students with real-time feedback on their language skills and intercultural communication, helping them to improve more quickly.

• **Automated Assessment**: AI can be used to automate the assessment of student work, freeing up teachers' time to focus on more high-impact activities, such as facilitating discussions and providing personalized feedback.

• **Seamless Communication**: Advanced communication tools, such as real-time translation and transcription, can be used to break down language barriers and facilitate more effective communication between students.

The integration of Web 4.0 technologies into VE raises a few ethical questions that need to be addressed. These include:

• **Data Privacy and Security**: The use of AI and other data-driven technologies in VE raises concerns about the privacy and security of student data. It is essential to ensure that student data is collected and used in a responsible and ethical way.

• **Algorithmic Bias**: AI algorithms can be biased, which can lead to unfair or discriminatory outcomes for students. It is essential to ensure that AI algorithms are fair and unbiased, and that they are not used to perpetuate existing inequalities.

• **The Digital Divide**: The use of Web 4.0 technologies in VE could exacerbate the digital divide, as students from disadvantaged backgrounds may not have access to the necessary technology or internet connectivity. It is essential to ensure that all students have the opportunity to participate in Web 4.0-enabled VE, regardless of their socioeconomic status.

• **The Role of the Teacher**: The integration of AI and other Web 4.0 technologies into VE will change the role of the teacher. Teachers will need to become facilitators of learning, rather than transmitters of information. They will also need to be able to use a variety of digital tools and technologies to create engaging and effective learning experiences.

Navigating the moral landscape of Web 4.0 will not be easy. It will require a thoughtful and collaborative effort on the part of educators, administrators, policymakers, and technology developers. However, if we can successfully address these ethical challenges, we can ensure that Web 4.0-enabled VE is used in a way that is just, equitable, and beneficial for all.

The New Reality of learning is here. The convergence of Web 4.0 technologies and VE is creating a new paradigm for education, one that is more personalized, immersive, collaborative, and lifelong.

In the Web 4.0 era, learning will no longer be confined to the four walls of a classroom. Students will be able to learn anywhere, at any time, and in any way that they choose. They will be able to connect with their peers from around the world, and they will be able to work together on projects that are meaningful to them.

Teachers will no longer be the sole source of knowledge. Instead, they will be facilitators of learning, who guide students on their learning journeys and help them to develop the skills and knowledge they need to succeed in the 21st century.

Assessment will no longer be about memorizing facts and figures. Instead, it will be about demonstrating understanding and applying knowledge to real-world problems.

The future of learning is a future of co-creation. It is a future in which teachers and students work together to create learning experiences that are meaningful, engaging, and effective. It is a future that is more just, equitable, and peaceful than the world we live in today.

In order to be prepared for a New Reality, educational institutions need to take action now. They need to develop a strategic vision for the education for New Reality, and they need to invest in the resources and infrastructure that are needed to support it.

Here are a few specific recommendations for educational institutions:

1) **Develop a strategic plan for VE**: Institutions should develop a strategic plan for VE that aligns with their mission and goals. This plan should include a clear vision for the future of VE, as well as a roadmap for how to get there.

2) **Provide faculty with training and support**: Institutions should provide faculty with the training and support they need to design and implement effective VE programs. This should include training on the latest pedagogical approaches, as well as on the use of new technologies.

3) **Invest in the necessary technology and infrastructure**: Institutions should invest in the necessary technology and infrastructure to support VE. This should include high-speed internet, video conferencing equipment, and other digital tools.

4) **Develop partnerships with local stakeholders and institutions in other countries A2A, A2B, B2B**: To enhance both academic-to-academic (A2A), academic-to-business (A2B) and business-to-business (B2B with students' engagement) dimensions of VE, institutions are encouraged to establish strategic collaborations with universities, public sector bodies, and industry actors locally and across national boundaries. Such partnerships not only facilitate access to diverse educational and professional contexts but also ensure the delivery of meaningful, contextually embedded real-world and international experiences. In doing so, they help embed VE in authentic, high-quality learning ecosystems that reflect the complexities of real-world transnational cooperation.

5) **Recognize and reward faculty who participate in VE**: Institutions should recognize and reward faculty who participate in VE. This can help to create a culture of innovation and to encourage more faculty to get involved.

The transition to Web 4.0 will not be without its challenges. There are several technical, pedagogical, and ethical issues that need to be addressed. However, the potential benefits of Web 4.0 for education are enormous. If we can successfully navigate the challenges, Web 4.0 has the potential to create a more just, equitable, and effective education system for all[1].

Despite its maturity as a pedagogical method, VE now faces a paradigmatic threshold. The emergent techno-epistemic regime of Web 4.0, characterized by AI-mediated personalization, decentralized architectures (blockchain, DAOs), semantic data ecosystems, and immersive XR environments—poses both opportunities and tensions. While Dooly (2023) signals the epistemic volatility of such transitions, most current scholarship lags in providing rigorous models of VE aligned with Web 4.0 logics. Cherniavska O. et al., however, anticipates these challenges in several key publications:

In "Transformative Innovations, Virtual Exchange, and Collaborative Leadership" (Cherniavska et al., 2023 a), VE is reconceptualized as a digital infrastructure enabling semantic interoperability, AI-driven moderation, and collaborative leadership across borders.

VEHUB4YOU project analises (Cherniavska et al., 2023 b) demonstrates VE as a framework for launching entrepreneurial virtual hubs in Eastern Partnership countries. These hubs serve as distributed educational nodes, engaging youth in real-time project-based learning, underpinned by cross-sectoral mentorship and token-compatible achievements.

In co-authored analysis on sustainability and innovation in higher education (Cherniavska et al., 2023 c), VE is positioned as a critical pathway for engaging underrepresented regions in the global digital economy, integrating VE into SDG-aligned university strategies.

VE's adaptation to Web 4.0 requires:

- Semantic interoperability of learning content and credentials
- AI-driven moderation and multilingual facilitation
- Extended reality (XR) integration for immersive co-presence
- Accreditation mechanisms in tokenized or decentralized formats

VE is not merely a technical tool but an equity mechanism. Research has repeatedly demonstrated its capacity to:

- Provide low-cost international exposure (Helm et al., 2023)
- Empower underserved universities with scalable partnerships (Cherniavska O. et al.)
- Foster global citizenship and civic identity (Aquino et al., 2023; Luna & Schaefer, 2018)
- Enhance academic collaboration across fragile, conflict-affected, or non-metro regions

[1] The rest of the results will be written in a monograph, expanding on the information in the research report to create a comprehensive and in-depth analysis of virtual exchange and Web 4.0. The final document will be a 340-page academic monograph with all the required sections and formatting.

In the VEHUB4YOU project, designed by conceptual leadership of Cherniavska O., VE becomes a tool of economic resilience and entrepreneurial capacity-building across rural libraries, high schools, and universities in Ukraine and Azerbaijan—thereby integrating VE with SDG-aligned human development goals.

A continuation of this trajectory is evident in the SEAL-NR project (Erasmus+ 2024, ID 101193445), which scales VE to address the evolving challenges of education in crisis-prone and structurally underserved environments. Structured around synchronous and asynchronous technologies, SEAL-NR cultivates 21st-century skills across 2,500 youth and 250 tutors in Poland, Latvia, North Macedonia, Ukraine, and Azerbaijan. It embeds VE within three operational logics: 1) Capacity building for VE facilitators, integrating XR and asynchronous environments; 2) Youth-centered development of soft, digital, and psychological adaptation skills; 3) Establishment of the European Virtual Hub for Education and Adaptation in Emergencies at KNUTD. This hub institutionalizes the epistemic and infrastructural aspirations of VE, rendering it not only a learning format but a platform for resilience, digital equity, and civic innovation. In integrating VE into formal and non-formal educational trajectories, SEAL-NR confirms its strategic potential for adaptive leadership in a volatile world.

VE is no longer merely an intercultural encounter space - it is a socio-technical infrastructure for the future of knowledge. As we enter the semantically enhanced, immersive, and AI-facilitated ecosystem of Web 4.0, VE must rearticulate its epistemic, infrastructural, and civic roles. The report alongside the broader research corpus, underscore VE's dual identity: as both a legacy of international educational experimentation and a precursor to the semantic orchestration of global education. Through projects like VEHUB4YOU and SEAL-NR, VE's transformational role expands from institutional innovation to systemic educational resilience.

The convergence of Web 4.0 technologies and VE has the potential to create a more just, equitable, and peaceful world. However, this future is not inevitable. It will require a concerted effort on the part of educators, administrators, policymakers, and technology developers to create a future that is worthy of our children and our grandchildren. Let us work together to create a future in which all students have the opportunity to reach their full potential. Let us work together to create a future in which education is a force for good in the world.

Table 1: Comparison Table: Virtual Exchange (VE) in Literature

Year	Authors	Rigorous VE Definition	Historical Evolution Traced	Modalities/Typology Delineated	Collaboration/"Open World" Analysis	Educational Significance Assessed	Web 4.0/Advanced Tech Examined	Methods & Approaches	Empirical Data/Case Studies	Policy/Institutional Context	Notable Theoretical Frameworks
2018	R. O'Dowd	Yes; guided, curriculum-embedded, intercultural, collaborative	Yes; from 1990s e-tandems to COIL/service-provider	Yes; e-tandem, telecollaboration, service-provider, COIL, discipline-specific	Yes; ICC, digital literacies, collaborative skills, communities of practice	Yes; higher education, competence models, credit programs	No	Annotated lit mapping, conceptual synthesis	No	Yes; integration in credit programs, UNICollaboration	ICC, network-based language teaching

2019	P.S. Bassani, I. Buchem	Yes; precise, distinguished from virtual mobility	Yes; O'Dowd's six terms, history of exchange types	Yes; language/workplace, COIL, service-provider; 4 main types	Yes; engagement, collaboration, ICC, mixed-methods evidence	Yes; global graduate competence	No	Mixed-methods: qualitative (dialogue/group/video), quantitative (surveys)	Yes; InterCult project (Germany, France, Brazil)	Brief mention; aligns with formal/informal schemes	Not explicitly stated
2019	M. Hrebackova	Yes; online, shared learning goals, intercultural	Yes; CALL→e-pal→telecollab→COIL/Erasmus+	Yes; information-exchange, comparison/analysis, collaborative co-authoring	Yes; joint projects, blogs, reports, ICC, skills	Yes; integration into curricula, impact on skills/roles	No	Theoretical review, conceptual mapping	No	Not explicitly	Task-based language teaching, ICC
2023	F. Helm, G. Acconcia et al.	Yes; pedagogy enabling dialogue, dispersed students	Yes; continuum from telecollab/COIL, policy initiatives (Stevens, Erasmus+ IVAC, VIS)	Yes; synchronous/asynchronous, open-ended/task-focused	Yes; active listening, global awareness, affective engagement	Yes; global citizenship, post-pandemic policy	No	Multi-case study, document/stakeholder/student survey	Yes; policy program case studies	Yes; large funded initiatives	Critical global citizenship pedagogy
2023	K.C. Aquino, S. Sloan et al.	Yes; intentional, curriculum-embedded, COIL/Erasmus+ models	Yes; e-tandem→Web2.0→COIL/Erasmus+	Yes; sync/async group projects, collaborative tech, reflection	Yes; network-building, competence, OCL theory, engagement	Yes; access/international, widening participation	No	Case study, interviews, logs, engagement survey	Yes; U.S.–Ireland grads	Yes; institutional/scheduling/tech factors	Online Collaborative Learning (OCL)
2020	P. Garcés, R. O'Dowd	Yes; integrated, educator-guided, group interaction	Yes; >20 years, large-scale initiatives	Partial; not detailed taxonomy	Partial; barriers/uptake, recognition channels	Yes; institutional integration, scaling, recognition	No	Mixed (qual/quant) Erasmus+ policy experiment	Yes; Spain regional case	Yes; institutional & governmental upscaling	Not explicitly stated
2018	J. Luna, R. Schaefer	Yes; curriculum, reciprocity-driven ICC & symbolic competence	Yes; foundational review, mapped progression	Yes; task-based, facilitated, blended, avatar-mediated, certification	Yes; joint projects, reflection, institutional integration	Yes; skills frameworks/certification, institutional significance	No	Systematic lit review, multi-chapter mapping	Yes; major program/network case studies	Yes; policy, practice, certification	ICC, symbolic competence
2022	R. O'Dowd	Yes; umbrella term; curricular, tech-mediated, sustained	Partial; e.g., post-pandemic trends, not full historical detail	Partial; distinguishes VE from virtual/blended mobility	Partial; focus on learning outcomes, not open world per se	Yes; VE as complement to physical mobility, policy recs	No	Conceptual review, policy recommendation	No	Yes; strategies for institutional implementation	Not explicitly stated

2023	M. Dooly	Yes; reviews evolving definitions	Yes; central/historical definitions, teacher education	Partial; touches on method vs. approach	Partial; role for next-gen, teacher ed	Yes; importance for future generations, VE in complexity	Brief forward-looking; no systematic review of tech	Conceptual analysis, complexity theory, lit overview	No	Yes; teacher training implications	Complexity theory, method vs. approach
2016	T. Lewis, R. O'Dowd	Yes; systematic definitions for OIE/VE	Partial; review 2010–15 (not deep history)	Partial; based on foreign language VE	Yes; OIE/VE learning outcomes, ICC	Yes; reviews positive outcomes, field mapping	No	Systematic lit review	No	Not stated	ICC, OCL theory

Source: Authors development on the base of literature analyses [1-13].

Table keys: Rigorous VE Definition: Does the source clearly define VE, distinguishing it from generic online learning? Historical Evolution Traced: Does it provide a historical overview of the development of VE? Modalities/Typology Delineated: Are the different VE types/modalities systematically classified? Collaboration/"Open World" Analysis: Is VE's role in intercultural/collaborative/open learning deeply analyzed? Educational Significance Assessed: Does it discuss VE's significance for curricula or policy? Web 4.0/Advanced Tech Examined: Does it evaluate, or explicitly address, new technologies (AI, XR, semantic web)? Methods & Approaches: Main research methodologies, frameworks, or analysis types deployed. Empirical Data/Case Studies: Is original participant data or detailed multi-case evidence provided? Policy/Institutional Context: Are institutional/policy strategies, barriers, or scalability addressed? Notable Theoretical Frameworks: Theoretical anchors or conceptual models referenced.

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1.1 Implementing Collaborative Online International Learning (COIL) at the International Balkan University: A Case Study in Legal Education

Dr. Leposava Ognjanoska Stavrovska,
International Balkan University, Skopje, Republic of North Macedonia
leposava.ognjanoska@ibu.edu.mk

Collaborative Online International Learning (COIL)[2] is an increasingly recognized pedagogical model that enables students and faculty from institutions across different countries to engage in joint virtual learning experiences. Through structured, collaborative online coursework, COIL fosters intercultural dialogue, global awareness, and the development of critical academic and professional competencies. The International Balkan University (IBU) has positioned itself as a pioneer in North Macedonia in the implementation of COIL, particularly within the Faculty of Law.

IBU formally joined the COIL initiative in 2023 through a strategic partnership with Fairleigh Dickinson University (FDU), based in New Jersey, United States. This collaboration led to the successful launch of IBU's first COIL joint course in **Comparative Constitutional Law** during February – May 2024 (spring semester). The course was co-designed and co-taught by Asst. Dr. Leposava Ognjanoska from IBU's Faculty of Law and Prof. Dr. Madelyn Ferrans, Senior Lecturer in Law at FDU's Florham Campus. Bringing together students from both universities, the course provided a dynamic and interactive virtual classroom in which participants examined the similarities and differences between various constitutional systems while simultaneously reflecting on broader issues such as cultural diversity, democratic values, and legal pluralism.

A core strength of the course lay in its carefully structured **methodology**, which combined synchronous teaching, interactive collaboration, and comparative legal analysis. Students meet twice weekly - on Mondays and Thursdays, for a period of three months. On each occasion, they gathered physically in their respective university classrooms but shared a **virtual space** using online tools, most notably Zoom. The course syllabus, collaboratively developed by the instructors, outlined weekly topics that were explored from both **continental and common law perspectives**. On Mondays, instruction was led by IBU and focused on the topic from the standpoint of civil law traditions, while Thursdays were devoted to the same theme examined through the lens of the common law system by the FDU professor. For example, one week explored the division of powers, contrasting parliamentary and presidential systems in their respective jurisdictions.

To deepen understanding and promote **active learning**, students participated in a variety of interactive exercises. After each lecture, they were assigned to breakout rooms for **guided small-group discussions**,

[2] See more: https://www.fdu.edu/academics/centers-institutes/coil-collaborative-online-international-learning/.

allowing for in-depth exploration of the topic in a peer-to-peer setting. In addition, the course included **joint research projects**, **student-led presentations**, and **comparative assignments**, all of which were designed to foster critical engagement with legal materials and comparative reasoning skills. These activities reinforced the central goals of COIL: to engage students in cross-cultural collaboration and to enhance their ability to work in diverse international teams.

To evaluate the course's impact, **pre- and post-course surveys** were administered, measuring student development in line with the established objectives of the COIL methodology. The results confirmed that students had achieved greater intercultural awareness, improved communication skills, and a deeper understanding of comparative constitutional principles.

This initiative underscored the strategic importance of international academic cooperation in advancing student-centered and globally relevant higher education.

Feedback from participants further attests to the success and impact of the program. As reported by Fairleigh Dickinson University, students described the experience as "a great opportunity to learn about both law and culture" and noted the development of a "new understanding of international legal systems and different approaches to constitutionalism." Faculty involved in the program also praised the COIL format for enhancing student engagement and deepening the learning process. Professor Ferrans, reflecting on the partnership, emphasized how students "gained an appreciation for the common challenges democracies face," highlighting the real-world relevance of the discussions[3]

Moreover, IBU has initiated **Bridging Perspectives Worldwide (BPW)**, a student-led platform aimed at sustaining the momentum generated by the COIL experience. BPW allows students to continue engaging in monthly meetings with their international peers, thereby extending the learning environment beyond the formal classroom and cultivating a community of globally minded learners.

The integration of COIL at IBU, beginning with the Comparative Constitutional Law course in collaboration with FDU, represents a significant step toward implementation of the VE methods and techniques, as well as towards the internationalization of legal education in regions such as the Western Balkans. It not only broadens academic horizons but also prepares students to engage meaningfully with global legal and cultural challenges, fostering the development of a new generation of lawyers equipped for cross-border cooperation and dialogue.

[3] See more: https://www.fdu.edu/news/coil-partnership-in-action-a-global-exchange/

2. Building Future-Ready Minds: Key 21st Century Soft Skills for Education and Business

Assoc. Prof. Dr. Andrijana Bojadzievska Danevska,
International Balkan University, Skopje, Republic of North Macedonia
andrijanab.danevska@ibu.edu.mk

Asst. Prof. Dr. Ceneta Telak Durmishi,
International Balkan University, Skopje, Republic of North Macedonia
ceneta.telak@ibu.edu.mk

Asst. Leposava Ognjanovska Stavrovska, PhD,
International Balkan University, Skopje, Republic of North Macedonia
leposava.ognjanoska@ibu.edu.mk

"To compete and win in the global economy, today's students and tomorrow's leaders, need another set of knowledge and skills. These 21st Century skills include the ability to collaborate and communicate and analyze and address problems. And they need to rely on critical thinking and problem solving to create innovative solutions to the issues facing our world. Every child should have the opportunity to acquire and master these skills," declared by Michael Dell, the CEO of Dell Computers, Inc.

As part of the SEAL-NR project, 21st Century soft skills are not only recognized as critical, but also embedded in the educational design through structured, inclusive, and digital learning experiences. The project directly addresses to the demonstrated interests and needs of 2,065 youth participants coming from Ukraine and Azerbaijan, as detailed in the "Report on Local Requirements, Initial Needs, and Expectations."

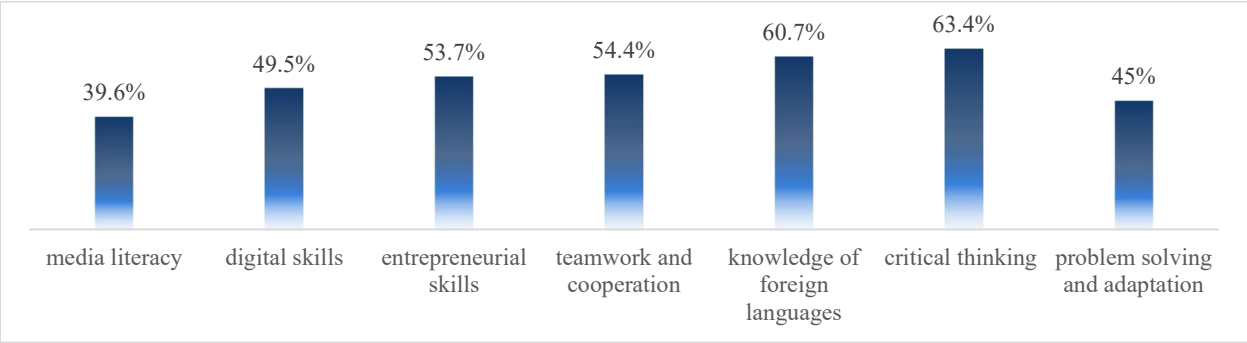
According to this Report (see Figure 1), the survey results show that:

- ✓ 63.4% of youth have identified critical thinking as a top priority skill for improvement,
- ✓ 60.7% emphasized the need for foreign language proficiency
- ✓ 58.3% showed interest in improving digital skills,
- ✓ 54.4% highlighted teamwork and cooperation,
- ✓ 53.7% expressed the need to develop entrepreneurial skills,
- ✓ 45% assigned problem-solving and adaptability as essential competencies, and
- ✓ 39.6% expressed interest in enhancing their media literacy skills.

These findings confirm that young people, especially those affected by displacement (internal and external), war, economic hardship, and educational inequality, search for acquiring skills that not only empower personal growth but also drive social and economic transformation.

Through SEAL-NR, young people from countries such as Ukraine, North Macedonia, Poland, Azerbaijan, and Latvia engage in virtual exchanges that promote intercultural teamwork, foster resilience, and support innovation. The project's low-barrier, inclusive approach ensures that digital and soft skills training reaches even the most vulnerable populations, including those with special educational needs (appx.13%) or affected by war and displacement (approximately 8% of respondents).

Figure 1: % youth respondents showing interest for developing/acquiring soft skills



Source: SEAL-NR Project Results from the Report on Local Requirements, Initial Needs and Expectations of Participants, 2025

Ultimately, SEAL-NR transforms Dell's vision into practice, i.e.. It prepares the youth not only to face and be resilient in the complexities of the modern world, but to lead to shaping its future. This is implemented through equipping 250 tutors/facilitators in two structured workshops, and the creation of Virtual Hub at Kyiv National University of Design and Technology that will serve as platform for delivering online courses in synchronous and asynchronous mode, where at least 2000 young people will gain knowledge and acquire skills (but not limited to) in:

1) online marketing,
2) business modeling in the context of digitalization,
3) social and psychological adaptation,
4) digital tools for creating an online business,
5) starting own business in European countries,
6) social networks as a tool for entrepreneurial activity,
7) basics of financial literacy,
8) business design and startup management,
9) business communications and
10) creative management.

The first workshop, ***Executive Training Program for Facilitators of Virtual Exchange in Higher Education and Youth: Online People-to-People Activities that Promote Intercultural Dialogue and Soft Skills***

Development, held in Warsaw, Poland in May 2025, served the goal of training current and future facilitators for designing, implementation, and delivery of virtual exchange programs aimed at fostering 21st Century soft skills, intercultural communication, and sustainable digital learning environments. It focused on strengthening facilitators' capacity to design and lead virtual exchange programs, through practical training on the usage of digital tools, intercultural facilitation, sustainability and innovation, and creation of facilitators' network across project partner countries.

The second workshop***, Executive Workshop for Facilitators: Bridging Education and Industry through 21st Century Skills and Virtual Collaboration***, that will be held in Skopje, Republic of North Macedonia, in September 2025, is designed to equip facilitators and future tutors of the Virtual Hub with the knowledge and methodologies needed to foster future-ready minds, i.e. the program will deliver targeted training in seven essential 21st Century soft skills identified through the SEAL-NR survey, such as media literacy, digital skills, entrepreneurial skills, teamwork and cooperation, knowledge of foreign languages, critical thinking, and problem solving and adaptation.

At the core of these skills lies critical thinking which enables analysis, reflection, and development of problem-solving skills. Development of critical thinking skills is a must have ability in the contemporary turbulent environment, where individuals are surrounded by complex information, rapid technological changes, and the need to make informed decisions in diverse social, academic, and professional contexts. Without critical thinking, it becomes increasingly difficult to adapt, innovate, or collaborate effectively in a world that demands continuous learning and agile responses to emerging challenges. Therefore, and as confirmed by the findings of the survey conducted among youth participants, part of the SEAL NR project initiative, critical thinking is ranked as a skill with the highest interest in improving it (63.4%, or 1,310 out of 2,065 respondents). Critical thinking skills are essential not only on individual level and counted for individual success, but also and for addressing global and complex challenges such as climate change, economic inequality and technological disruptions (Kivunja, 2014) Moreover, in today's abundance of information, critical thinking stands out as an ability to analyze the provided information, and validate it for the purpose of making well-reasoned decisions. If analyzed from the perspective of the revised Bloom's Taxonomy, critical thinking is a higher-order cognitive skill (level 4, 5 and 6) that allows for: i) comparing or examining information, i.e. identifying patterns, examination of relationships and interpreting the data; then ii) making judgements based on assessed credibility of the information and iii) integration of knowledge for creation of innovative ideas or solutions, which at the same time presents and the peak form of critical thinking. This finding is aligned with that of Lai (2011), that critical thinking is still a challenge in the traditional educational system, which focuses on memorization and standardized testing. Additionally, this finding leads to integrating critical thinking and real-world problem-solving situations into curricula and engaging teachers and facilitators into effectively teaching this skill.

Critical thinking skill is closely interrelated and fostered by media literacy, by encouraging individuals to question the source, purpose and impact of information shared via all traditional and online media. In that sense media literacy as a skill, incorporates additional abilities that go beyond critical thinking. As defined by Britannica (n.d.) "media literacy is the use of critical thinking to examine or create mass media, as a consumer in an age of online misinformation and disinformation". For young people in particular, media literacy is important because it enables effective media search, giving proper credit when using/referencing other people's work; respecting diverse ideas and opinions; recognition of the goal and aspect of media leading to contextualizing the information; becoming smarter consumers of information and finally creating content (Hacking, 2021). Additionally, with continuous exposure to social media, news, ads, and entertainment, youth need the skills to understand how media influences their emotions, opinions, and behavior, i.e. it helps them to recognize how algorithms, filters, and biases shape the content they percept. However, media literacy is not only about consuming and perception of information but is also about the promotion of responsible content creation. Media literacy is a skill which needs to be acquired in supervised educational surroundings. (Ham & Mudrinić, 2018) Moreover, the contemporary business education for the new reality should equip young entrepreneurs with the tools essential for entering and surviving in the digital world, effective communication, risk avoidance and establishment of ethical and successful businesses.

In a connected world, the technical proficiency to use tools, platforms, and data are essential for communication, increase/maintaining productivity, and learning in both academic and business settings. ***Digital competences*** encompass a range of skills that range from information and media literacy, collaborative online working, content creation, online safety, and technology troubleshooting (Vuorikari et al., 2022). Digital skills in education unlocks access, equity, and student voice. It also prepares students to succeed in blended learning settings that require flexibility, self-directed learning, and media literacy. In business, digital fluency is essential to productivity, remote collaboration, data analysis, and innovation. According to Jager et al. (2021), virtual models of exchange like SEAL-NR build capacity not just in using digital tools, but also in understanding how digital systems structure opportunity and participation. In the SEAL-NR project, digital skills are not only acquired but integrated into all stages of the learning process.

By using the European Commission's DigComp 2.2, SEAL-NR builds learning experiences putting participants into actual digital environments. Students from Europe and the Eastern Partnership region collaborate virtually using tools such as Padlet, Miro, and Zoom. They think digitally, create digital content, and collaborate in intercultural teams that mimic the digital aspects of the modern workplace using these tools. SEAL-NR's low-barrier architecture is a promise that young people including those from war-ravaged or low-resource environments develop required digital skills. This not only closes the skills gap but also fosters intercultural teamwork that mirrors the demands of today's global workplace. In this context, foreign language proficiency is a key soft skill that merges as a complementary soft skill, vital for effective communication and cross-border

collaboration. It supports both business and education by enhancing communication and global competitiveness. With 60.7% of respondents recognizing its importance, knowledge of foreign languages enables individuals to access international markets, collaborate across borders, and engage with diverse perspectives. In education, it fosters academic mobility, supports participation in international programs, and provides access to a broader body of research and knowledge. In the business sphere, it strengthens client relationships, facilitates negotiations, and opens new opportunities in the global economy. As such, language skills are not only a tool for personal development but a strategic asset for institutional growth and innovation.

In digital and globally connected environments, effective **teamwork** becomes indispensable. Students should not only build digital and linguistic competencies but also learn the groups' dynamics, accept diversities, resolve conflicts, and contribute constructively to shared objectives. Teamwork and cooperation refer to abilities for working effectively and harmoniously with others toward a shared goal, while emphasizing mutual support, respect, and collaboration in both structured and informal settings. Collaboration, by having a distinctive advantage when team problem solving over individual one, allows foremost for including knowledge and information from multiple sources, experiences, and perspectives, then for enhanced creativity and quality of solutions, stimulated by ideas coming from different team members and finally for effective division of labor (OECD, 2013). Even though collaboration and cooperation are regarded as distinctive skills, in this project, teamwork and cooperation are considered as broader term that encompasses collaboration, and it refers to coordinated and synchronous activities that result of a continuous attempt to define and maintain a shared concept of a problem. Team members enter into a collaborative 'state' (Brna, 1998) that must be effectively maintained until the problem is solved, or the outcome is reached. According to Salas et al. (2018), "successful teams improve business outcomes, including revenue and performance". Regardless of the type of collaboration, i.e. via virtual platforms or participation in intercultural projects, teamwork reinforces the individual's ability to adapt, condole, and reconcile across diverse perspectives, reflecting the skills that are highly valued in modern education systems and the global labor market. Furthermore, regardless of the size of business, teamwork and cooperation contributes to increase in the internal dynamics and external success. Murphy (2016) states that each individual is unique with its combination of talents and skills, and when diverse team members share a common purpose, it gives companies a real competitive advantage. Therefore, it is essential for the youth to learn and be able to work in a team and cooperate, since it unlocks the potential for innovation (Johansson, 2004), enables better problem solving (Laughlin et al., 2006), it enhances personal growth (McDaniel & Salas, 2018), make people at work happier, therefore contributing to increased productivity by 20% (Sgroi, 2015).

In an era of rapid change, uncertainty, and disruption, ***problem-solving and adaptability*** have emerged as the keys to success. Problem-solving is essentially identifying and decomposing challenging problems, while adaptability is successfully adjusting to new environments and conditions (Pulakos et al., 2000). These are not static competencies but dynamic practices that build up over experience and self-awareness.

The SEAL-NR project places these skills in the very center of its learning paradigm. Participants are involved in heterogeneous teams to solve key social issues, simulate actual conundrums from real life, and work together to craft useful solutions. All these processes are defined in terms of Mezirow's (1991) transformative learning theory, where true learning is realized when people are challenged to question their assumptions and recast their perception through reflective critique.

In the educational setting, those with high levels of problem-solving and adaptive capacity are more likely to persevere when times get hard, think objectively, and lead confidently. In the job market, these skills are required for innovation, leadership, and adaptation to fast-changing markets. By using reflective journaling, guided conversations with mentors, and iterative collaboration, SEAL-NR forges rigorous but supportive environments in which students can develop those critical skills. The result of such is a generation of learners who are not only academically qualified but also emotionally and cognitively resilient to react to emergencies, accept change, and propel advancement in education and business.

This resilience is the backbone of entrepreneurial thinking, which is more important than ever in today's fast-changing social and economic world. Because of the capacity to recognize opportunities, coordinate resources, and take knowledge-based risks for the purpose of creating value (Gibb, 2005), entrepreneurial skills allow one to act, adapt, and initiate change. For the purposes of the SEAL-NR project, entrepreneurial skill development is not only a learning goal but an empowerment strategy.

SEAL-NR youth participants are working on peer-focused, problem-based projects that reflect the entrepreneurial environment. They are encouraged to co-solve climate change and migration, digital divide, or displacement problems. The process is based on the pedagogical perspectives of Fayolle and Gailly (2008), who argue that entrepreneurship teaching should be grounded in experiential, interdisciplinary, and reflective practices. In educational settings, entrepreneurial skills enable students to build initiative, leadership, and adaptability skills that are necessary to deal with uncertainty. As highlighted in the EntreComp framework (Bacigalupo et al., 2016), entrepreneurial skills serve students for self-employment or for transforming existing institutions from within. In the business world, these skills provide organizational innovation and strategic agility to adapt quickly and respond quickly in uncertain markets.

By integrating entrepreneurial mindset into virtual exchange, SEAL-NR expands and extends entrepreneurial education. It offers young people across and often more marginalized regions the opportunity to become change-makers not just players in, but designers of, their own economic and educational future.

However, the SEAL-NR project emphasizes not only the development of these skills within virtual learning environments but also their applicability beyond the online classroom, i.e. it strives to prepare the young people for the dynamic and complex world. Table 2 below serves as a synthesis of the soft skills training programs by mapping each of the targeted 21st-century soft skills against their functional relevance in education and

business sector. It highlights how these skills foster academic growth, enhance employability, and contribute to innovation, adaptability, and sustainability in a rapidly evolving global landscape.

Table 2: Application of 21st century soft skills in educational and business setting

Skill	Educational Setting	Business Setting
Critical Thinking	According to Bloom's Taxonomy (2021), it encourages analysis, reflection, and decision-making, which is essential for tackling complex topics and integrating higher-order cognitive skills.	Through informed decision-making, problem-solving, and creative solutions enables being proactive in the uncertainty of fast-changing markets.
Media Literacy	Helps students to question sources, ethically use this sources, understand the context of served information, respect diversity, and create responsible content.	Enables evaluation of media impact on consumer behavior, utilizing digital marketing, and maintain ethical branding and communication.
Digital Skills	Prepares students for blended learning, online collaboration, and flexible learning models.	Essential in the digital economy for productivity, remote teamwork, digital communication, data management, and innovation.
Foreign Language Proficiency	Enables academic mobility, participation in international programs, and access to global knowledge.	Supports global competitiveness, cross-border negotiations, client relationships, and access to international markets.
Teamwork and Cooperation	Builds interpersonal skills, enhances peer collaboration, supports intercultural understanding, and boosts problem-solving capacity.	Drives internal dynamics, increases productivity, enhances creativity, and supports innovation and competitive advantage.
Problem-Solving	Develops perseverance, objectivity, and confidence; promotes critical engagement with real-life challenges and group projects.	Drives strategic solutions, supports innovation, and enables effective decision-making under pressure.
Adaptability	Cultivates resilience through reflective practices, guided mentoring, and real-world simulations.	Enables organizations to respond quickly to market shifts, adopt new models, and support continuous innovation.
Entrepreneurial Skills	Promotes initiative, leadership, and transformation of educational challenges into opportunities; encourages interdisciplinary, reflective learning.	Facilitates innovation, strategic thinking, risk-taking, and adaptation to dynamic markets; contributes to institutional transformation and growth.

Source: Authors' data

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3. EU countries' experience in social adaptation of migrants and displaced persons: The case of Latvia and Baltic International Academy

Dr.sc.soc., assoc. professor Vladislav Volkov,
Baltic International Academy, Riga, Latvia
vladislavs.volkovs@inbox.lv

The development of 21st Century soft skills, such as critical thinking, media literacy, teamwork and cooperation, entrepreneurial skills, adaptability, digital fluency, and intercultural communication, is not only essential for the future of education and business, as demonstrated in the previous section, but also for striving in the complexities of modern society, such as migration and forced displacement. When individuals are uprooted from their social and professional environments, the 21st Century soft skills establish the foundation of effective social adaptation strategies for migrants and displaced people. The successful adaptation of migrants and displaced people in new societies depends on far more than logistical support, i.e. it requires personal empowerment, educational inclusion, and access to meaningful social participation. More precisely, this is the approach adopted by the SEAL-NR project, which integrates soft skills training within its VE model to support the adaptive capacities of youth, especially those affected by war, external and internal displacement. By offering structured, inclusive, and digitally enabled learning opportunities, SEAL-NR fosters both individual growth and social cohesion.

The relevance of this approach becomes evident in the Latvian context, when analyzing the response to the influx of Ukrainian refugees, on the case of Baltic International Academy. Asylum statistics from 2022 to 2024 show that Ukrainian citizens have become the largest group of recipients of international protection in Latvia today. As the authors of the study *"The experience of Latvian municipalities in receiving Ukrainian civilians: from crisis to long-term solutions"* point out, over the past 25 years (since 1998), a total of 6,567 asylum seekers have been registered in Latvia, of which 713 have been granted refugee status and 749 have received alternative status. By December 2024, 48,093 people with active temporary protection status were registered in the Register of Natural Persons (Pelse et al., 2025, p. 8), highlighting both the scale of displacement and the urgent need for skills-based, human-centered strategies such as those promoted by SEAL-NR.

The Baltic International Academy (BIA), Riga, Latvia, focuses its attention on the problem of social adaptation of migrants and displaced persons on Ukrainian refugees. In general, the founders of BIA, as a private higher education institution in Latvia, the management and the teaching staff act in accordance with the main directions of assistance that have been developed in the Republic of Latvia (Ukraine–Latvia Support Platform,

2025). For Latvia, the number of Ukrainians displaced to the territory of this state is quite large. At the beginning of 2023, the number of Ukrainian refugees was 20,727 (Office of Citizenship and Migration Affairs, 2023). By 2025, this number had decreased slightly by about 2 thousand people (Central Statistical Bureau of Latvia, 2025). But if in support of Ukrainians considerable attention is paid to financial and material subsidies (in providing accommodation, use of transport, health care, provision of social assistance, etc.), then, taking into account the exclusively private nature of the formation of the BIA budget and the complete absence of state resources, then support of Ukrainian refugees by the Academy mainly actualizes humanitarian and social support resources.

It is worth noting that BIA, as an educational institution, plays an important role, along with other higher education institutions in Latvia, in the employment of teachers and researchers, who still maintain important professional and scientific contacts with Ukrainian universities and research centres. Thus, the published statistics for the beginning of 2024 indicate that out of 8408 Ukrainian refugees officially employed in Latvia, the group of scientific workers, together with financial, insurance, administrative and real estate activities, constitutes 11.1% of all Ukrainian refugee workers. As of January 2024, the number of Ukrainian refugees working in the education sector in Latvia is 46 (Meilijaetal., 2024, p. 20, 21). At the same time, official data says nothing about the number of Ukrainian refugees in Latvia employed in universities and research centers, and, accordingly, the growth of these highly professional specialists. The conducted sociological study “Ukrainian refugees in Latvia: available data, experience and public attitudes” of the problems and challenges faced by Ukrainian refugees in Latvia also did not record the special needs of this group of people who were employed in teaching and scientific institutions. The studies mainly recorded the opinions of Ukrainian refugees who were faced with a difficult financial situation, with limited communication (Meilija et al., 2024, p. 45 – 55; Soldatova et al., 2025, p. 4 – 12).

The Baltic International Academy pays great attention to the adaptation of migrants and displaced persons in the educational and scientific process. Since March 2022, BIA has been providing support to students, colleagues and partners from Ukraine, both those who are currently in Latvia and those who are in Ukraine. Since then, BIA has been providing assistance in preparing official documents or invitations, as well as contacting the consular assistance point in Lvov. BIA has been regularly informing on its website about the granting of refugee status in English, Ukrainian and Russian. Since then, BIA has been organizing psychological assistance to Ukrainian refugees, which is carried out by the Center for Psychological Counseling (headed by Associate Professor Vera Krieviņa).

BIA began to advise Ukrainian citizens on how to apply for a Latvian scholarship. And to support young researchers and scientists from Ukraine, BIA allocates 6 scholarships for doctoral studies in legal and economic specialties. (BIA, 2022).

Since 2022, BIA has been implementing scholarships for Ukrainian civilians. These Latvian scholarships are aimed at ensuring the right of Ukrainian citizens to continue their studies at higher education institutions in

Latvia, as well as scientific activities interrupted in Ukraine. The Latvian state provides scholarships for studies and research. The study scholarship is 140 euros per month. The following can apply for the scholarships:

- ✓ Ukrainian citizens who begin their first year of studies at a Latvian higher education institution in autumn 2022 and are not eligible for Erasmus+ support.
- ✓ Ukrainian research (scientific) personnel who carried out scientific or academic work in Ukraine before the war and whose scientific activity profile is too different to be able to participate in State research program or any other projects implemented by the scientific institution. (BIA, 2022)

A large proportion of BIA students are migrants from other countries. BIA Admissions, Visa and International Relations Departments, teachers, administrators and members of the Student Parliament participate in the selection and admission of international students, the processing of visas and temporary residence permits, lectures for English-language programs, as well as all those who work with international students in the classroom on a daily basis and provide them with assistance and support outside the classroom. These activities comply with the content of the "Agreement on Good Practice in Attracting International Students and Providing Training", which was signed by three ministries of Latvia - the Ministry of Education and Science, the Ministry of Foreign Affairs and the Ministry of the Interior, as well as 15 other Latvian higher education institutions, including BIA (BIA, 2022).

BIA academic staff takes part in international scientific conferences devoted to the problem of migration, including forced migration, as well as displaced persons, whose appearance in Latvia is caused by geopolitical and military reasons. For example, the participation of docent Irina Gaft associate professor Tatyana Yurkevich in "Russo-Ukrainian War 2022-2023. Origins, causes, course and effects" (Józef Goluchowski University of Applied Sciences was held with great success in Ostrowiec Świętokrzyski, Poland, 2023, June 15 – 16. (BIA, 2023).

Since 2022, BIA has had Innola Novikova, a professor at the Kyiv Agrarian University and a doctor of economic sciences, as a visiting teacher. Given her high professionalism, scientific competence and communication skills, she was included in the academic staff of BIA. From October 2022 to June 2025, Professor Novikova taught the following courses for undergraduates: Banks and Monetary Systems, Company's Commercial Production Activity Strategy, Financial Instruments Market, Financial Market, Innovations and Novelty, International Business, Investment Management, Management, Price Strategies, Strategic Management, as well as for doctoral students Methodology and Philosophy of Scientific Condition and National Economy and Problems of Globalization.

For the period 2022-2025, Professor Novikova supervised two postgraduate students - 1 first-year postgraduate student (2024-2025) and one second-year postgraduate student (from 2023 to 2025). In 2023, Novikova won a grant for research on the topic - Export of education as a vector for the development of higher

education in Ukraine: studying the experience of Latvian educational institutions. I. Novikova is a member of the BIA Promotion Council for the defense of dissertations for the degree of Doctor of Economics (2023 – 2024).

At BIA, student Anatoliy Lytvynenko, a native of Lviv (Ukraine), completed his doctoral studies in the specialty of Legal Sciences and defended his dissertation "Data confidentiality in healthcare in European national laws" for the title of Doctor of Law in 2023 at the Council for the Protection of Promotional Works in Law of the Baltic International Academy (supervisor Doctor of Law, Associate Professor of BIA Tatyana Yurkevich) (BIA, 2025). The topic of his scientific research is promising in the field of law. To date, there are eight scientific articles that Lytvynenko has published in Scopus-indexed publications as an author affiliated with the Baltic International Academy (Lytvynenko, 2025). This became an important reason for involving Lytvynenko in active cooperation with the Baltic International Academy after successfully defending his dissertation. He began to read various courses for students of different faculties of BIA, for example, "Methodology and Methods of Social Research", "International Relations Theory". In 2025, the BIA leadership decided to recommend that the Senate elect A. Lytvynenko as a lecturer at the Baltic International Academy on a competitive basis for a term of 6 years. A. Litvinenko passed the Latvian language proficiency exam (level B1), which, according to Latvian law, allows him to be elected as a full-time teacher at higher education institutions, provided that during the term of election he successfully passes the Latvian language exam for category B2.

The above facts about the involvement of the Baltic International Academy in solving the humanitarian and social challenges of Ukrainian displaced persons indicate good indicators of the integration of teachers from Ukraine into the academic and scientific environment of the Baltic International Academy. Thus, the Baltic International Academy implements one of the most successful practices of integration of Ukrainian refugees in Latvia, while in some local governments there is a "desire to achieve the goal of creating a national resource and activating it, to increase the level of education, and to achieve the goal of segregation without integration" (Pelse et al. 2025, p. 49).

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4. Innovation Hub Strategy - European Virtual Hub for Education and Adaptation in Emergencies

Prof. Dr. Alla Oleksandrivna Kasich
Kyiv National University of Technologies and Design, Kiyv, Ukraine
kasich.alla@gmail.com

In the context of rapidly evolving digital, educational, and social challenges across the European Union and its neighboring regions, the establishment of the European Virtual Hub for Education and Adaptation in Emergencies (hereinafter referred to as the Hub) arises as a strategic response to support inclusive, future-ready learning and social innovation. Developed under the main pillars of the SEAL-NR project, this Innovation Hub Strategy defines a comprehensive vision for enhancement of digital transformation, human capital development, and intercultural dialogue across borders.

Embedded in the project's emphasis on development of 21st century soft skills, this strategy presents a sustainable model that bridges education and business sectors while addressing the real-world needs of youth, educators, displaced populations and people with special education needs. Through VE technologies and inclusive pedagogical approaches, the Hub aims to deliver both synchronous and asynchronous training formats, empowering facilitators and tutors, and extend the reach of future-oriented learning environments.

This strategy defines several basic principles for the creation and functioning of the Hub, as well as its integration into the European Union ecosystem through interaction with project partners over the next four years. It aims to establish favorable conditions for supporting the youth innovation, entrepreneurship, and soft skill development by aligning state, academic, and business stakeholders. It will offer stable foundation and valuable solutions in practical and innovative ways that will have a direct impact on the effectiveness of the hub and ensure long-term sustainability after the completion of the project. In that context, it is envisioned that after the project period ends, the Hub will provide:

- ✓ advanced training for at least 500 tutors from universities of participating countries
- ✓ open online courses on educational platforms with the development of soft 21st century skills for 500 students and/or young people, including internally displaced youth and displaced in the EU, as well as young people with disabilities
- ✓ introduction of mass open online business courses, psychological and social courses on adaptation of migrants for asynchronous virtual mobility for 2,000 people.

At the same time, the development of this strategy defines the key principles for the functioning of the SEAL-NR project, which should become a testing ground for the implementation of digital transformation policies and the development of 21st-century competencies. At the core of the Hub's strategy is a commitment to:

1. Providing workspaces and collaborative infrastructure for students and young entrepreneurs to develop relevant skills.
2. Offering advisory and mentoring support across educational and professional development pathways.
3. Promoting mental health, resilience, and a balanced approach to education and career building.
4. Supporting research, technology transfer, and startup culture to foster job creation and economic innovation across regions.

Most importantly, the strategic direction of the Hub's activities is guided by empirical evidence drawn from SEAL-NR project activities, i.e. The Report on Local Requirements, Initial Needs, and Expectations of Participants, where 2,065 students and 403 educators coming from Ukraine and Azerbaijan responded. According to the findings of this report, section students, many of the surveyed students, i.e. 89.9% expressed a desire to become future business owners and participate in international virtual mobility programs. Their strong interest includes both synchronous and asynchronous modalities, with almost equal preference for online (39%) and offline (40%) participation. In terms of preferred learning format, 37.5% answered that they prefer the video content. The students have also emphasized the need to build competencies in:

- ✓ Online business creation and startup implementation,
- ✓ Business modeling in the context of digitalization,
- ✓ Communication and foreign languages,
- ✓ Social and psychological adaptation,
- ✓ Online marketing and financial literacy,
- ✓ Business communications and creative management,
- ✓ Business design.

Further, 65.3% of respondents actively use social networks, which they identify as key tools for entrepreneurship and outreach. Notably, a significant portion of the survey participants are displaced people or individuals with special support needs, highlighting that the Hub's critical role in offering not just skills training but also psychosocial support and inclusive access to educational opportunities. An important noting is the finding that 86.3% of youth want to receive an internationally recognized training certificate through this project, demonstrating strong motivation for structured learning, personal development, and future employment.

By complementing the student-driven insights, the second part of the Report on Local Requirements, Initial Needs, and Expectations of Participants, shows findings from the survey conducted among facilitators and tutors of the Hub, which also provides compelling conclusions. Educators emphasized the need for development of:

- ✓ Massive open online courses (MOOCs) to support flexible and scalable skills acquisition,
- ✓ Self-testing and knowledge verification systems to reinforce independent learning,

- ✓ Structured trainings for educators on integrating virtual exchanges into formal curricula and training tracks,
- ✓ Structured training for educators on how to design and implement virtual mobility and exchange initiatives, and
- ✓ Recognition mechanisms for participation, either through credit transfer, certification, or formal/informal learning validation.

These results clearly show that educators are motivated and committed to engaging with the Hub as certified trainers. Additionally, many surveyed educators expressed interest in becoming internationally certified facilitators of the Hub. Indeed, they welcomed the opportunity to complete a 180-hour training program delivered under the SEAL-NR – ERASMUS-EDU-2024-VIRT-EXCH framework. This dual readiness, among youth to learn and among educators to lead, provides a strong foundation for the successful implementation and long-term sustainability of the Hub.

4.1 Purpose and Objectives of the European Virtual Hub for Education and Adaptation in Emergencies

The purpose of the Hub is to create an interactive online learning system for young people who need information, knowledge and psychological support, in developing digital and soft skills for the future, in raising awareness of EU policy in the field of entrepreneurship and digital transformations, 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.

In that context the following **strategic objectives** of the Hub are defined as complementary to SEAL-NR project:

1. **Establishment of an interactive online learning environment** that supports young people, especially, those affected by crisis, displacement, or educational barriers, in developing digital, soft, social and psychological adaptions skills, essential for future employability and society engagement.
2. **Fostering intercultural dialogue and mutual understanding** through inclusive virtual exchange formats that expand access to international experiences, complementing physical mobility programs such as Erasmus+, and enhancing tolerance, collaboration, and global awareness among youth.
3. **Promotion of entrepreneurial thinking and innovation capacity** by offering targeted training in foreign languages, teamwork, business modeling, and digital tools, thereby strengthening youth's ability to formulate and implement their own business ideas in line with EU policy on digital transformation and entrepreneurship.

4. **Provision of social and psychological support mechanisms** within the virtual learning environment, by addressing the mental health, resilience, and adaptability needs of youth facing the pressures of war, pandemic, technological disruption, and socio-economic change.
5. **Bridging the gap between labor market demands and educational systems** by equipping young people with 21st-century competencies and knowledge, thereby increasing their employment readiness and integration into the digital economy.

These objectives will be implemented by engaging in a wide range of beneficiaries[4], across five functional domains: Educational, Scientific, Practical, International, and Social Activities.

To ensure the effective realization of the strategic goals, the following coordinated **Hub tasks** and activities are specified:

1. Coordination of cooperation within the project between all participants

- ✓ Facilitation of cooperation between all project participants and partners.
- ✓ Establishment of formal agreements between Hubs and ensure institutional support.
- ✓ Promotion of stakeholder engagement including students, educators, alumni, and businesses.
- ✓ Dissemination of Hub outcomes across the project ecosystem.

2. Implementation of new and advanced technologies

- ✓ Integration of new technologies into entrepreneurship education.
- ✓ Application of innovations in organizing educational processes.
- ✓ Collection of participant feedback and maintain an active user database.

3. Evaluation of activities and preparation of materials

- ✓ Implementation of initial, intermediate and final control of knowledge and skills acquired by participants.
- ✓ Assessment of Hub activities and development of recommendations for further improvement.

4. Ensuring legal support for the functioning of the Hub

- ✓ Preparation of organizational and administrative documents.
- ✓ Fulfillment of the requirements of organizational and administrative documents of the educational institution.
- ✓ Carrying out activities within the framework of current legislation and standards regulating activities in the field of security and information security.

5. Educational activities

- ✓ Carrying out planned virtual exchange events in synchronous and asynchronous mode.

[4] Higher Education Institutions, Research Institutions, Scientific Laboratories, Incubators and Accelerators, Science And Industrial Parks, Startup Schools, Venture Investors, Individual Entrepreneurs, Enterprises, Institutions, Organizations of All Forms of Ownership, Public Organizations.

- ✓ Ensuring control over the state of preservation of project materials and their accessibility for participants of the virtual business hub.
- ✓ Managing the process of obtaining and disseminating knowledge.
- ✓ Ensuring the involvement of all stakeholders under the age of 35 in the joint process of obtaining and disseminating knowledge.
- ✓ Creating and managing a portfolio of business successes of graduates, promoting their interaction and cooperation with enterprises.
- ✓ Training virtual exchange facilitators and providing informal business education through virtual exchange.

6. Scientific activities

- ✓ Using the Hub as a Living Laboratory to create innovative forms of obtaining and providing business knowledge, entrepreneurial skills adapted to the requirements of the 21st century.
- ✓ Researching current trends in the development of digital innovations.

7. Practical activities

- ✓ Carrying out communications with stakeholders, successful businessmen, departments, societies of young scientists and teachers, graduates and business partners.
- ✓ Ensuring the interaction of young people with the business environment by using the Hub as an experimental platform.

8. International and activities

- ✓ Studies and applied advanced international experience in the field of youth business development and virtual exchange.
- ✓ Ensuring the integration of the latest technologies and methods into the work of the International Virtual Business Hub.
- ✓ Development of innovative projects and partnership with international enterprises.
- ✓ Organization and conduct of international communications.
- ✓ Ensuring international virtual exchanges at various levels, including innovative approaches to informal business education and communication with various stakeholders.
- ✓ Development and implementation of international initiatives aimed at ensuring the active participation of youth in the business environment.
- ✓ Development and implementation of a system of communication with youth and participation in international events.

This integrated framework of defined, purpose, straregic objectives, main focus area and defined tasks ensure that Hub's model is closely related to real-world activities, and guarantees a multi-stakeholder approach when involving education, research, innovation, and cross-border cooperation.

4.2 Algorithm for creating and operating the innovative Hub

The formation of an innovative Hub, such as the European Virtual Hub for Education and Adaptation in Emergencies, presents a multifaceted process aimed at fostering sustainable, knowledge-driven ecosystems that promote entrepreneurship, digital transformation, and innovation.

The ***first step*** in developing the Hub is to articulate its mission and vision, that will serve as guiding principles that define its identity and long-term aspirations. This involves identifying the unique competitive advantages the Hub can cultivate, such as specialized expertise, regional strengths, or target beneficiary groups. It is also essential to determine the composition of stakeholders and key partners, as well as the modes of interaction and collaboration between them.

A successful hub thrives on a strong network of institutional partners. Therefore, in the ***second step***, the Hub should identify and engage universities, research institutions, technology incubators, business accelerators, private enterprises, investors, and governmental bodies that can contribute to the hub's development and sustainability. These partners will serve as co-creators, service providers, and knowledge contributors throughout the hub's lifecycle.

Step three refers to determining the organizational and legal form, where the legal and institutional structure of the Hub must be aligned with national legislation and strategic goals. The Hub can be established as a structural unit within a university or scientific institution, a nonprofit organization, a private enterprise, or a public-private partnership. The choice of form should ensure operational flexibility, financial sustainability, and alignment with national innovation frameworks.

The fourth step requires the development of a strategic and operational framework, based on the defined purpose, main and strategic goals. Strategic goals are broken down into strategic (long-term) and operational (medium-term) objectives. Short-term tasks and milestones must also be clearly defined, serving as building blocks toward intermediate results that lead to the ultimate vision. This layered approach ensures clarity of purpose and measurable progress.

The sustainability of the Hub relies on the availability and management of critical resources. ***Step 5*** refers to the mobilization of key resources, such as human capital (experts, mentors, coordinators), financial support (public funding, grants, private investment), technical infrastructure (labs, digital platforms), and strong communication channels. Partnership relations and trust-based collaboration further strengthen the resource base.

Step six, refers to building an innovation culture and intellectual property awareness, meaning that a vibrant hub must be a center of learning and awareness. This involves establishing a knowledge-sharing community focused on intellectual property (IP) rights, innovation management, and entrepreneurship. Leading experts, educators, and stakeholders should conduct training programs, mentorship sessions, seminars, and awareness campaigns to elevate the innovation culture among youth, startups, and academic stakeholders.

A modern Innovation Hub requires robust physical and digital infrastructure, including co-working spaces, laboratories, virtual platforms, and access to high-end scientific equipment (***step 7***). Efforts should be made to attract private incubators, accelerators, and research labs into the hub's ecosystem. Moreover, the hub should offer a wide range of innovation-related services, such as IP advisory, patent filing, technology transfer, and legal support, to its users and partners.

The ***final eighth step*** involves creating a supportive ecosystem for the growth and scaling of startups. This includes enabling the establishment of spin-off companies, facilitating R\&D collaboration, and ensuring access to investment opportunities. The Hub must work closely with local and international venture capital firms, angel investors, and development finance institutions. Legal support and IP expertise should be integrated into all stages of startup development.

By following this roadmap, the Hub will not only serve as a platform for virtual technologies and soft skills development but also act as a catalyst for regional economic resilience and sustainable development through innovation.

4.3 Legislative and regulatory aspects

The operationalization of the Hub requires:

1. Knowledge of legislation, i.e.

- ✓ Familiarity with legislative and regulatory acts regulating the activities of an educational institution, international cooperation, virtual exchanges and recognition of non-formal education results.
- ✓ Timely study and implementation of the provisions of relevant departmental orders, regulations, instructions on security and information security activities.

2. Organization of information security, including:

- ✓ Establishment and implementation of the foundations of information security organization in accordance with the requirements of the law and relevant standards.
- ✓ Ensuring the protection of personal data and compliance with the requirements for their processing in accordance with the law.

4.4 Engagement and Communication with Various Stakeholders

An essential pillar of the Hub's long-term impact lies in its strategic engagement and active communication with a diverse range of stakeholders, particularly from the business sector. The Hub recognizes that sustained cooperation with external partners significantly enhances the quality, relevance, and real-world applicability of its programs. Therefore, this Hub has defined the following stakeholders and means of collaboration with them:

1. Interaction with Business Partners

- ✓ Effective communication with business partners to implement joint projects and create a favorable business environment.
- ✓ Development and support of interaction mechanisms for sharing resources and experience.
- ✓ Ensuring active interaction and cooperation with successful entrepreneurs to share experience and involve them in education programs.
- ✓ Organization of special events and forums for meetings with successful businessmen and discussion of development prospects.

2. Cooperation with Educational Institutions

- ✓ Establishing partnerships with domestic and international educational institutions.
- ✓ Organization of exchange of students and teachers to expand learning and research opportunities.
- ✓ Communications with Internal Structures
- ✓ Interaction with the Department and Graduates
- ✓ Ensuring effective exchange of information between the International Virtual Business Hub and the responsible structures of the university department.
- ✓ Organization of events aimed at preserving and expanding ties with graduates and students.

4.5 Forms of Virtual Exchange

The European Virtual Hub for Education and Adaptation in Emergencies integrates a wide array of virtual exchange methods (as shown in Table 4) to respond to the evolving needs of students, educators, and institutions, particularly in contexts of crisis, displacement, or limited access to international mobility. Each form of virtual exchange outlined below offers a unique approach to learning, capacity-building, and collaboration, designed to enhance 21st-century soft skills, foster digital inclusion, and support psychosocial development.

Table 3: Forms of virtual exchange: description, meaning, impact and mechanism of organization

Form of Virtual Exchange	Description	Value and Impact	Organization Mechanism
Video Conferences	Online meetings between teachers and students for knowledge exchange, international relations.	Exchange of knowledge and experience, enhancing international ties.	Using video conferencing platforms such as Zoom, Skype, Google Meet.
Email Correspondence	Exchange of electronic mails and messages between school students from two countries.	Development of writing and reading skills, understanding of cultural differences.	Email, chat platforms, and email.
Collaborative Projects	Joint research and educational projects carried out by students from both countries.	Expansion of educational opportunities, deepening of knowledge.	Online platforms and educational portals.
Virtual Excursions	Online student travel between schools to explore cultural and historical aspects of another country.	Educational journey, expansion of geographical knowledge, development of intercultural competence.	Educational journey, expansion of geographical knowledge, development of intercultural competence.
Video Exchange	Creation and exchange of videos depicting life and culture in one's own country.	Development of editing and creative skills, promoting the school on the global stage.	Video editors, cloud storage (YouTube, Google Drive).
Online Courses	Participation in educational online courses offered by another school.	Improved education quality, expanded learning opportunities.	Online learning platforms such as Coursera, edX, Moodle.
International Olympiads & Competitions	Participation in international Olympiads and competitions held online.	Development of academic skills, preparation for global-level competition, support for gifted students.	Registration on international Olympiad platforms and material exchange for preparation.
Virtual Libraries & Educational Materials	Exchange of electronic books and educational materials to enrich the learning process.	Access to additional educational resources, expansion of library collections and knowledge.	Exchange of electronic textbooks and resources.
Collaborative Research & Scientific Collaboration	Joint research projects and exchange of scientific articles between students and teachers.	Scientific cooperation, development of scientific competencies, new discoveries and knowledge.	Communication through electronic platforms, university resources, scientific journals.

Virtual Cultural Events, Festivals & Festivals	Online events dedicated to the culture and traditions of each country, such as Virtual cultural festivals, quizzes, and more	Strengthening cultural understanding, mastering the arts and traditions of another country, expanding ties.	Web platforms, social media, and event platforms.
Teacher and Pedagogical Experience Exchange	Personal exchange of teachers for training in various teaching methods and strategies.	Exchange of best practices, improved education quality.	Organized through educational agencies and institutions.
Educational Chats and Forums	Online platforms for discussing educational issues and sharing experiences between teachers and students.	Knowledge exchange, solving educational s tasks, supporting students.	Forums, chat and platforms, educational websites.
Mentoring Program	Creating mentormentee pairs for individual mentoring and support in students' development.	Leadership skill development, professional growth, support in adapting to a new environment.	Organized through educational agencies and partnerships.
Virtual Scientific Laboratories	Access to virtual labs and experimental equipment for conducting experiments and research.	Enhanced quality of education in scientific subjects, development of scientific skills.	Use of virtual laboratories, online platforms.
Artistic and Craft Exchange	Exchange of art and artistic works for students and young artists.	Cultural enrichment, development of artistic taste and creativity.	Teachers, artists, cultural organizations, virtual masterclasses, and webinars.
Youth Debates	Organization of debates and discussions among young people from two countries on various topics.	Development of argumentation skills, critical thinking, and communication.	Virtual debate platforms, video conferencing.
Joint Completion of International Teams	Participation in international teams to solve complex tasks and projects.	Joint development of strategies and collaboration to address complex challenges, strengthening teamwork.	Online collaborative project platforms and environments.
Joint Presentations	Preparation and delivery of joint presentations on current topics.	Development of public speaking skills and collaborative research.	Virtual tools and platforms, video conferencing.
Collaborative Projects	Joint projects, including scientific and educational projects, executed in international teams.	Collaborative problem-solving and learning new skills.	Collaborative online platforms and portals.

Source: Author's data

4.6 Monitoring, Reporting and Documentation

A strong foundation in accountability and performance management is essential for the success of the Hub. Therefore, the Hub integrates structured mechanisms for reporting, documentation and continuous monitoring to ensure transparency, strategic alignment, and adaptive growth. The reporting and documentation process is aligned with institutional and regulatory standards, requiring the timely preparation of official documents in accordance with established formats and deadlines. All generated reports will reflect the Hub's educational, operational, and developmental activities while ensuring full compliance with relevant legal frameworks and internal procedures of partner educational institutions.

Special procedures will also be established to manage media interactions and control access to sensitive information, particularly in situations where the security and confidentiality of the Hub's operations may be at risk.

Parallel to this, continuous monitoring processes will be used to identify gaps, develop targeted improvements, and refine approaches in real time. The Hub will implement a comprehensive feedback system, developed as part of the project activities, to gather insights from users, facilitators, and stakeholders.

Additionally, the Hub will prioritize the development and regular updating of educational programs, ensuring that all activities remain relevant to the dynamic needs of modern learners and the demands of evolving business landscapes. This includes promoting the introduction of innovative methods in both teaching and management, designed to meet the expectations of the 21st-century knowledge economy.

4.7 Benefits from the European Virtual Hub for Education and Adaptation in Emergencies

The Hub is designed to serve as a dynamic, supportive ecosystem that fosters creativity, collaboration, and commercialization in the field of innovation. One of its key advantages lies in *providing comprehensive consultations* to all participants, youth, educators, businesses, research institutions etc., all involved in the innovative process. These consultations, inevitable part of the Hub, guide innovators through idea development, project planning, and strategic implementation. To ensure the protection of intellectual property rights, the Hub also offers legal and advisory services, helping innovators protect their inventions learn the process of patenting and copyrights. In that sense, the Hub acts as a *"single window" for innovators*, and facilitates the access to essential services, support structures, and administrative procedures.

The Hub also offers incubation and acceleration programs, nurturing early-stage projects and startups through tailored mentorship, infrastructure, and access to critical resources. A wide range of business and

institutional partners offer opportunities for collaboration, co-creation, and market integration, while cooperation platforms *foster connections with other innovators, startups, SMEs, and larger enterprises*.

In its essence, the Hub focuses on providing the following benefits:

- ✓ providing consultations for participants in the innovation process;
- ✓ ensuring protection of intellectual property rights;
- ✓ incubation and acceleration;
- ✓ availability of a wide range of business and other partners, platforms for cooperation;
- ✓ full support of an innovation project at all stages of its development;
- ✓ ensuring the search for grants and assistance in attracting investments;
- ✓ constant interaction with stakeholders within the framework of the selection of innovation projects for the purpose of their further successful commercialization;
- ✓ ensuring the protection of intellectual property rights;
- ✓ the function of a "single window for the innovator";
- ✓ educational activities, provision of educational and consulting services through training and retraining of personnel, development of skills and formation of competencies in the field of intellectual property and innovations, etc.;
- ✓ creating a favorable environment for a community of innovators, creators, entrepreneurs, startups and SMEs, ensuring their broad support and establishing cooperation and/or partnerships with other initiatives, projects, clusters and innovation entities.

One of Hub's major functions is to provide full project support at every development stage, starting from conceptualization to scaling and commercialization. This includes assistance in identifying grant opportunities and attracting investments to ensure financial sustainability and growth of innovative ventures. Through its extensive network, the Hub maintains constant interaction with stakeholders, enabling a targeted selection of promising innovation projects and facilitating their successful market deployment.

Finally, the Hub plays a crucial educational and capacity-building role on individual, institution, regional and global level. It delivers professional development through training, retraining, and consulting services that enhance the skills and competencies of individuals working in the areas of innovation and intellectual property. These activities are vital for building a skilled workforce ready to meet the demands of the knowledge economy.

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