A STUDENT-CENTRIC WORKING-LIFE COMPETENCE DEVELOPMENT A JOURNEY FROM CLASSROOM TEACHING TOWARDS 'ONLIFE' LEARNING: PEDAGOGICAL BEST PRACTICES

Paresh Rathod*, Pasi Kämppi**

*Laurea University of Applied Sciences – paresh.rathod@laurea.fi

**Laurea University of Applied Sciences – pasi.kämppi@laurea.fi

ABSTRACT

In recent years the digital transformation and pandemic emergency demanded the digitalisation of contemporary higher education (HEIs) in Europe. The situation needs transformational vision, legislative and operational support from the HEI stakeholders, government, and relevant bodies. However, the most critical element is a working-life, and the industry demands a new set of skills and competencies from HEIs graduates. The ECOLHE European innovation project presented the Onlife Manifesto for being human in the hyperconnected world. More broadly, it helps start a reflection on how a hyperconnected world calls for rethinking the many existing practices in HEIs. On the one hand, the hyperconnected world demands a new way of future competencies. And on the other hand, many research studies confirm that a clear gap between HEIs competence development and market demands resulted in a significant shortfall of the workforce and working-life-ready graduates. The most interesting thing in these studies shows the lack of suitable working-life candidates causing this shortfall rather than the organisation's willingness to hire. In Finland, the education ministry has manifested future-proofing of the education system to meet the demand of modern businesses and a hyperconnected world under the Vision 2030 development. In Vision 2030, one of the key development areas identified was a modern curriculum design and development that meets the rapidly changing demands of working life and society. Laurea University of Applied Sciences has positioned its education offering to fill the gap demand gap and towards Vision 2030. Laurea adopted online education and an innovative pedagogical model that strengthens students' futureproof competence development and workforce capacity building. A student-centric working-life competence development, a journey from classroom teaching towards 'Onlife' learning presents the pedagogical best practices. The paper focuses on the adaptation of continued curricula development, adopting modern online pedagogical and education approaches, and increasing industry cooperation and work-life practices. The paper addresses two-fold challenges, including meeting the demands of working-life professionals and future-proofing education offerings.

Keywords: Digital transformation, Working-life ready graduates, Futureproof higher education, Working-life competence development, Digital pedagogy best practices

1. INTRODUCTION AND BACKGROUND

The rapid pace of technological change and the increasing complexity of the global economy are placing new demands on higher education institutions. With the rapid digital transformation and evolving market needs, traditional teaching methods are being replaced by innovative pedagogical practices that integrate real-world experiences and industry cooperation (Capogna, et al., 2021, Rathod and Kämppi, 2021). To prepare students for the challenges of working life, European Higher Education Institutes

(HEIs) need to adopt new pedagogical approaches that focus on developing students' working-life competencies. The paper highlights the importance of aligning curriculum design with the demands of working life and examines the role of Laurea University of Applied Sciences in spearheading this educational revolution. The research also identifies pedagogical best practices for designing engaging online courses, blending theory with practical experiences, fostering collaborative learning and cooperation with working-life partners (Jassim, 2022; Clark-Wilson, et al., 2020; Ezugwu, Ofem, Rathod., 2016). The implications and benefits of student-centric competence development are discussed, emphasising its potential to address workforce demands, future-proof education offerings, and enhance workforce capacity (Vuorikari, Kluzer and Punie, 2022; Punie, et al., 2017).

Further, this paper argues that a student-centric approach to working-life competence development is essential for future-proofing the education system. A student-centric approach puts the learner at the centre of the learning process and empowers them to take ownership of their own learning. This can be achieved through the adoption of modern online pedagogical approaches, such as blended learning, and collaborative learning with symbiotic learning approaches (Monteiro & Leite, 2021). The paper begins by providing a brief overview of the digital transformation of higher education institutions. It then discusses the gap between the demands of working life and the skills and competencies of graduates. The paper then outlines a vision for future-proofing the education system through a student-centric approach to working-life competence development (Voinea and Roijakkers, 2023). Finally, the paper discusses the implications and benefits of this approach.

2. THE DIGITAL TRANSFORMATION OF HIGHER EDUCATION INSTITUTIONS IN EUROPE

The digital transformation of higher education institutions is a global phenomenon driven by several factors, including the increasing availability of online learning resources, the growing demand for lifelong learning, and the need to prepare students for the challenges of working life in the 21st century (Garrison, 2017). For example, digital transformation is a major force reshaping higher education institutions (HEIs) in the European Union (EU).

The European Union (EUA, 2021; EC, 2020a; EC, 2020b) responded relatively well to the digital age by adopting new technologies and teaching methods as a process of the digital transformation of HEIs. And the digital transformation of higher education institutions presents many challenges, including and not limited to: (1) Major investment needs in new technologies, especially digital technologies, which can be expensive to purchase and maintain. (2) To train staff on new technologies, especially the staff need to be trained on how to use new technologies effectively in teaching and research. (3) The need to ensure students have access to digital technologies Not all students have access to the same level of digital technology. (4) The need to develop new curricula, programmes, and teaching-pedagogical methods (Anderson, 2020; Monteiro & leite, 2021). Digital technologies can be used to create new and innovative teachingpedagogy methods within the market-demanded degree programmes.

The Future of Digital Transformation in Higher Education: The digital transformation of higher education institutions can also bring several benefits, including and not limited to only the benefits discussed in this section. The digital transformation of higher education is an ongoing process. As new technologies emerge, higher education institutions must continue to adapt and innovate. The future of higher education will be increasingly digital, and institutions that can embrace the digital transformation will be better positioned to succeed. The digital transformation of higher education institutions has a number of implications for pedagogy. Traditional teacher-centered pedagogy is no longer sufficient in a digital age (Bates, 2015). Students need to be actively engaged in the learning process, and be able to access information and resources from a variety of sources. Modern online pedagogical approaches, such as blended and collaborative learning, can help achieve this.

The Role of the Digital Pedagogy: As we understood from the above section, digital pedagogy is a practice using digital technologies and tools to support learning and teaching. ***Following are the key***

aspects of digital pedagogy (Rathod & Kämppi, 2021; Siemens, 2005; Bates, 2015): Active learning, Personalisation, Flipped classroom, Blending learning, Fully online or distance learning, Collaboration, Accessibility, and Assessment.

Symbiotic learning and teaching processes play a vital role; it critically argues that digital pedagogy is not simply about replacing traditional teaching methods with technology but instead using technology to enhance and support teaching and learning in ways that were not previously possible (Anderson & Dron, 2011).

Symbiotic learning systems can be applied in HEIs to improve the effectiveness and efficiency of learning and decision-making. The effective implementation of digital pedagogy and symbiosis learning methods can significantly improve the quality of learning and teaching in EHEA[11] (Mayer, 2014; Siemens & Tittenberger, 2009)

3. GAP ANALYSIS- COMPETENCIES DEVELOPMENT AND MARKET DEMANDS

There is a growing gap between the demands of working life and the skills and competencies of graduates (EUA, 2019; EUA, 2020a; EC, 2020c; CEN, 2021; Vuorikari, Kluzer and Punie, 2022). This gap is due to several factors, including the rapid pace of technological change, the increasing complexity of the global economy, and the changing nature of work. The European Union (EU) has also been facing number of challenges in recent years, including a skills shortage, an ageing population, and a changing labour market. These challenges have led to a gap between workers' skills and the skills demanded by the market. To address this gap, the EU has developed several initiatives, including the European Qualifications Framework (EQF), European Skills Agenda, EU Digital Framework (DigiComp), European e-Competence Framework (e-CF), European Cybersecurity Skills Framework (ECSF) and initiatives like ESCO (European Skills, Competencies, Qualifications and Occupations) Classifications.

The EQF is a common reference framework for qualifications across the EU. It provides a way to compare qualifications from different countries and sectors. The European Skills Agenda is a set of policy measures to improve skills development and lifelong learning. Despite these initiatives, the gap between working-life competence development and market demands remains a challenge in the EU. Several factors contribute to this gap. The gap between working-life competence development and market demands is a significant challenge for the EU. However, it is a challenge that can be overcome through a combination of policy initiatives, investment in education and training, and a commitment from all stakeholders to realistically respond to the digital transformation phenomenon.

4. FUTURE-PROOFING THE EDUCATION SYSTEM IN FINLAND: VISION 2030

Finland has long been a leader and renowned for its successful education system, consistently ranking at the top of international assessments. In recent years, the Finnish government has developed and set forth a vision for education in 2030, focusing on future-proofing the system and its educational landscape to meet the challenges of a rapidly changing world. Finland's Vision 2030 and its significance in creating an education system that meets the evolving needs of the future. To future-proof the education system, HEIs need to adopt a student-centric approach to working-life competence development. This approach should focus on developing students' ability to think critically, solve problems creatively, and collaborate effectively.

The Finnish higher education institute Laurea University of the Applied Sciences (Laurea) is also reshaping its vision for the future by leveraging the advantages of digital transformation with a new

[11] European Commission. (2018). Digital Education Action Plan. Retrieved from https://ec.europa.eu/education/sites/education/files/digital-education-action-plan-jan2018_en.pdf

pedagogical practice model and student-centric approaches to working-life competence development. This can be achieved by adopting modern online pedagogical approaches and renewed student development processes, including blended learning and collaborative learning with learning by developing (LbD) practice model (Garrison, 2017; Bates, 2015). Blended learning combines traditional face-to-face instruction with online learning activities. Collaborative learning involves students working together to solve problems and complete tasks. Online and distance learning is more for students who are looking for a flexible, affordable, and convenient way to learn. The paper presents the student-centric working-life competence development best practices from the case study of the Laurea University of Applied Science's Business Information Technology (BIT) degree programme as described in the following sections.

5. STUDENT-CENTRIC WORKING-LIFE COMPETENCIES DEVELOPMENT

The European business environment and communities are rapidly changing, and it is more important than ever for students to develop the working-life competencies they need to succeed in the workforce (EC, 2020a; EC, 2020b; EC, 2020c). This is especially true in business information technology (IT), where new technologies and trends are constantly emerging. Student-centric working-life competence development is an approach to learning that focuses on the individual student needs and working-life's requirements. It is based on the idea that students learn best when they are actively engaged in the learning process and when they can apply what they are learning to real-world situations, workplace development and solving societal or business challenges. To prepare students for the workforce, Laurea's business information technology (BIT) programme realised the importance of focusing on developing students' working-life competencies. Working-life competencies are the skills and knowledge that enable individuals to succeed in the workplace. Working-life competencies include the most important aspects, such as building a solution-oriented mindset, creating a goal- and target-oriented study plan, problem-solving, critical thinking, teamwork, communication, and developing professional-ethical competencies through pedagogical practices.

A student-centric approach to working-life competence development has several benefits for students. It can help students to develop their critical thinking, problem-solving, and collaboration skills. It can also help students to become more self-directed learners and to develop a lifelong learning mindset. A student-centric approach to working-life competence development also has several benefits for employers. It can help employers find graduates with the skills and competencies they need. It can also help employers to improve their workforce productivity and innovation. Laurea University of Applied Science, Finland's two researchers (Rathod and Kämppi, 2020) embarked on the journey to develop a degree programme that meets the need for working-life competencies and future-proofing the education programme. Their development approach is based on the Laurea and Finland's education strategical vision that includes "research first," "real-world needs," and "human-growth." They conducted various studies, including market demand, discussing with industry experts, observing real-world needs, expert group workshops, brainstorming with thought leaders and mastermind groups, attending seminars, knowledge sharing amongst professional colleagues, participating-engaging with knowledge cluster networks, students' feedback, and teamwork on the various level. The educational ministries' vision and strategies played a vital role during this development work. The study's outcome can be summarised by identifying the key working-life competencies described below.

The following are some specific examples of working-life competencies that can be developed through student-centric learning: (1) Goal-oriented targets, (2) Learning-oriented mindset, (3) Creative and Critical thinking, (4) Problem-solving and solution-oriented mindset, (5) Adaptability, (6) Self and time-management, (7) Teamwork and communication, (8) Decision-making, (9) Empathetic and value-based practices, (10) Ethical and Professionalism, (11) Digital and content professional proficiencies, (12) Leadership and Life-long learning.

Our working-life partners and studies confirm that students can be well-prepared for success in the workforce by developing these competencies. These competencies development integrated with the

business information technology degree programmes with two specialisation tracks in cybersecurity and digital service development.

6. PEDAGOGICAL BEST PRACTICES FOR DEVELOPING STUDENT-CENTRIC WORKING-LIFE COMPETENCIES

Our study confirms several pedagogical best practices that can be used to implement a student-centric approach to working-life competence development, including and not limited to designing engaging and interactive online courses, considering human-development approaches, blending theory with practical experiences, and facilitating collaborative learning and industry partnerships. However, our case study found it too difficult to realise in the practices. This case study leverages the digital pedagogy's benefits and working-life-driven approaches.

Our study finds that the student-centric approach to working-life competence development has several implications and benefits. There are implications and benefits that address working-life professionals' demands, future-proofing education offerings and enhancing workforce capacity and competence development. The following sub-sections present our findings and best practices of the student-centric working-life competencies development.

Goal-oriented Learning with Personal Study Plan: Goal-oriented learning can help students to achieve their goals, succeed in their studies, and develop the skills they need for their future careers (Garrison, 2017; Rrmillstf, Steenbrugge, Machalow et al. 2021).

Implementation in practice: Laurea BIT programme introduces the students to the personal study plan (PSP), recognising students' previous competencies and planning overall working-life growth. The process helps- what do students want to achieve by the end of their degree? Once they know what they want to achieve, their personal study plan, courses and assignments are helping them to develop a plan for how they are going to achieve it. The personal study plan helps students to identify their learning goals, break down large goals into smaller, more manageable tasks, set deadlines for each task, provide regular feedback on students' progress, and celebrate successes.

Developing Learning-oriented Mindset with Pedagogical and Working-life Skills: It is evident that most students do not realise the values of pedagogical development. Most of the students focus on cognitive development rather than holistic human growth mindset. First and foremost, many students are unaware of what it means to learn and pedagogical practices (Anderson, 2020; Palloff & Pratt, 2007).

Implementation in practice: Laurea BIT has introduced an orientation course that teaches students the learning theories, and learning approaches, to be learning-oriented, be curious, embrace study challenges, be persistent, be self-aware, respect different opinions, seek feedback, self-management, time-management, and celebrate success. The study plan includes the following study units (micro-courses) in students' personal study plan.

- Study Skills and Professional Orientation (2 ECTS)
- Professional Development (2 ECST)
- Starting a Successful Career (1 ECTS)

The above courses provide inductions and awareness of the working-life skills development, including goal-oriented, learning-oriented mindset, creative and critical thinking, problem-solving and solution-oriented mindset, adaptability, self and time-management, communication, teamwork, decision-making, empathetic and value-based practices, ethical and professionalism, digital and content professional proficiencies, leadership, and life-long learning.

Furthermore, advanced courses in cybersecurity also offer students an orientation module that includes (1) Course goal setting with a personal study plan, (2) The learning and pedagogical workshop and

study materials (3) Ethical and professional commitment to studies. The orientation module teaches students the importance of learning, studying, and pedagogical practices. This empowers students to focus on learning and studying rather than solely focusing on grades. Therefore, grades are not the primary focus; instead, the emphasis is on learning, professional development, and personal growth, which are the most important aspects of the educational programme.

These practices encourage students to reflect on their learning and provide them with opportunities to practice self-regulation, professional development, creative and critical thinking with a supportive learning environment.

Self and Time-management: Many studies (Monteiro & Leite, 2021; Dumitru, Radovici, Rasiti and Veselinovic, 2023; Vuorikari, Kluzer and Punie, 2022) confirm the challenges faced by higher education students in managing themselves, as well as time and resources. Our study confirms that developing good self- and time-management skills helps students succeed more efficiently, leading to improved self and time management and eventually developing efficient resource management skills.

Implementation in practice: In practice, advanced BIT programme courses offer students personal study plan with goal-setting assignments that help students precisely plan their target grades level, identify content targets, identify learning method, and time management with the entire course schedule with manageable weekly modules and study time plan, the importance of the students' values for the course target, celebrating success, ethical and professional practices. This helps students set realistic expectations from the course along with realistic goals, create a schedule, eliminate distractions, start working on assignments early, take care of their health, well-being and seek help when needed, adapting to personal learning methods, and understand the importance of professional and ethical values.

Problem-solving and Solution-oriented Mindset: The course learning activities and assignments encourage students to find solutions to problems and come up with creative solutions (Bates, 2015).

Implementation in practice: Every module within a course includes self-learning assessments and different assignments encouraging students to brainstorm and providing them with opportunities to work on real-world problems. Teachers are open about their own problem-solving process and share mistakes. The pedagogical approach provides opportunities to try new things and fail. We are continually encouraging students to find sensible solutions and not dwell on the problems all the time by analysing the situation effectively. It is vital to provide students with real-world problems, opportunities to practice problem-solving, feedback on their problem-solving skills, a supportive learning environment, encourage collaboration and use available technology freely. We have experienced that the more students practice problem-solving, the better they are becoming at finding solutions.

Creative and Critical Thinking Skills: The higher education promotes and empowers students to be deep thinkers and positive doers (Voinea & ROijakkers, 2023). It is essential to intertwine such skills development within each phase of the studies.

Implementation in practice: The course learning activities and assignments encourage students to foster critical thinking and encourage students to ask questions. We provide these opportunities through discussion forums where students can discuss course material, participate in debates, and write learning reflections that require students to explore different perspectives. As explained in the previous section that providing opportunities with problem-based learning that focuses on real-world problems. Students are given a problem to solve. This type of learning requires students to use critical thinking skills to analyse the problem, identify possible solutions, and evaluate the pros and cons of each solution.

A supportive environment is essential for fostering creativity and critical thinking. Students need to feel safe to take risks and share their ideas. Instructors can create a supportive environment by being encouraging, open-minded, and respectful of all students. The course assignments expose students to a

variety of perspectives. This is done by assigning readings from different authors and sources, inviting guest speakers from different backgrounds, and encouraging students to participate in workshops, seminars, and hackathon. In addition, we provide an opportunity to students how to evaluate information. This includes teaching them to identify credible sources, distinguish between fact and opinion, and identify bias. Additionally, helping students develop their voice. This means encouraging students to be original, to take risks, and to express themselves in their own unique way. The teachers provide these opportunities in communications, tutoring, assignments, self-reflections, and counselling, along with working-life event participation where they can network and express themselves freely.

Ethical and Professionalism Skills: The course learning activities and assignments encourage students to develop ethical and professional skills (Rovai, 2004). The courses are developed in a way that offers the process of teaching students the values and behaviours expected of them in their professional lives. This includes honesty, integrity, respect, and responsibility, along with the professionalism of communicating effectively, solving problems, and working collaboratively.

Implementation in practice: Laurea BIT programme offers study units(courses) that provide opportunities for ethical and professional skills development, as it is an important investment in the future of students. As referred to in previous sections, advanced courses in cybersecurity also offer students an orientation module that includes learning tasks and learning activities that help students with (1) Course goal setting with a personal study plan (2) The learning and pedagogical workshop, and study materials (3) Ethical and professional commitment to studies.

By developing these skills, students can increase job satisfaction, improve career prospects, enhance workplace relationships, and increase productivity along with their chances of career success and positively impact the communities.

Professional Skills Development: During the market demand studies, it was frequently reported that every job advert and company seek professional certification from potential employees (EC, 2020c; Vuotikari, Kluzer and Punie, 2022). It is especially evident in the field of information technology (IT and ICT).

Implementation in practice: Laurea BIT degree programme reviews the curriculum regularly, working with industrial partners and expert groups in addition to the "research first" approach. The cybersecurity specialisation curriculum is mapped with working-life professional certifications, working-life methods, and proven frameworks. Now, the student finishing the course, is provided with an opportunity for the professional training, comprehensive studies in the professional certification body of knowledge, hands-on practices, applications of the learnt skills and participating in professional events. The research confirms that professional certification is a credential that demonstrates that an individual has met the specific knowledge, skills, and abilities required to perform a particular job or occupation.

The Laurea BIT programme's many courses are mapped with these professional certification and body of knowledge training. Therefore, the education offering is directly relevant to workforce capacity-building efforts. The successful students in the courses can demonstrate their expertise to employers and potential employers, gain access to professional development opportunities, stay up to date on the latest trends in their field, network with other professionals and enhance their career prospects.

Teamwork and communications: It is evident from the market demand studies (EC, 2020c; Vuotikari, Kluzer and Punie, 2022). teamwork and communication are essential skills for success in higher education and the workforce. During our job portal analyses- many jobs require employees to work collaboratively with others from different backgrounds and cultures. Teamwork and communication skills can help students succeed in their studies and prepare them for the workforce. Teamwork skills offer the ability to work effectively with others, resolve conflict, and share ideas. Communication skills empower the ability to express oneself clearly, listen attentively, and build relationships.

Implementation in practice: Laurea BIT programme and courses integrated these skills development process working in experiential learning, including problem-solving tasks, project tasks, simulations tasks, applied learning tasks, real-world assignments, and project work with working-life partners. The teamwork, communications and professional skills develop by participating in workshops, seminars, webinars, and hackathon events, including industry visits. The courses offer many of these possibilities, including participating in EU and National Innovation projects, including ECOLHE project tasks.

Leadership and lifelong learning: Leadership and lifelong learning are two important concepts necessary to intertwine in HEIs (Bates, 2015; Jonassen, 1999; Lave & Wenger, 1991). Leadership refers to the ability to serve, influence and motivate others. In contrast, lifelong learning refers to the ongoing process of acquiring new knowledge and skills. Our study also confirms that it is more important than ever for students to develop strong leadership and lifelong learning skills in the rapidly changing world. Leaders are needed in all sectors of society. On the other hand, to be successful in today's economy, workers need to adapt to change and continue learning throughout their careers.

Implementation in practice: Laurea's advanced cybersecurity courses offer an opportunity for the students to develop their learning skills and value the importance of lifelong learning, strategic thinking, problem-solving and decision-making skills. These competencies developed through various modes, including learning activities and tasks, learning reflections, participating in professional training, offering short workshops, hands-on practices, professional event participation, and networking with working-life professionals and partners.

7. CONCLUSION

In conclusion, a student-centric approach to working-life competence development is essential for future-proofing the education system.

A student-centric approach to working-life competence development is an educational philosophy that focuses on the needs and interests of the individual student. This approach emphasises student engagement, active learning, and the development of transferable skills that are relevant to the workplace.

There are several reasons why a student-centric approach to working-life competence development is essential for future-proofing the education system. First, the world of work is changing rapidly, and the skills that are needed for success in the future are constantly evolving. A student-centric approach can help students to develop the skills they need to adapt to change and to be successful in whatever career they choose. Second, the traditional model of education, which is based on a teacher-centered approach, is no longer effective for many students. In this model, the teacher is the primary source of information, and students are expected to passively receive this information. However, research has shown that students learn best when they are actively engaged in the learning process. A student-centric approach can help to make learning more active and engaging for students. Finally, a student-centric approach can help to improve student motivation and achievement. When students feel that they are in control of their own learning, they are more likely to be motivated to learn and to achieve their goals.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the project 'Empower Competences for Onlife Learning in HE' (ECOLHE) under grant agreement and Project Code: 2020-1-IT02-KA203-079176. The sole responsibility for the content of this paper lies with the authors. The authors are grateful for the financial support of these projects that have received funding. The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

REFERENCES

[1] Capogna, S., Cocozza, A., Cecchini, G., De Angelis, M. C., De Gennaro, G., Poggi, B. D., & Proietti, E. (2021). Digital Technologies in HE: from the European vision to the university governance-European framework

[2] Jassim, L. L. (2022). Using E-learning technologies in teaching and learning process. *International Journal of Social Learning (IJSL)*, *1*(1), 15-23.

[3] Clark-Wilson, A., Robutti, O., & Thomas, M. (2020). Teaching with digital technology. *Zdm*, 1-20.

[4] Ezugwu, A. E., Ofem, P. O., Rathod, P., Agushaka, J. O., & Haruna, S. (2016). An empirical evaluation of the role of information and communication Technology in Advancement of teaching and learning. *Procedia Computer Science*, *92*, 568-577.

[5] Vuorikari, R., Kluzer, S. and Punie, Y., DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes, EUR 31006 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-48883-5, doi:10.2760/490274, JRC128415.

[6] Punie, Y., editor(s), Redecker, C., European Framework for the Digital Competence of Educators: DigCompEdu , EUR 28775 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-73718-3 (print),978-92-79-73494-6 (pdf), doi:10.2760/178382 (print),10.2760/159770 (online), JRC107466.

[7] Monteiro, A., & Leite, C. (2021). Digital literacies in higher education: Skills, uses, opportunities and obstacles to digital transformation. Revista de Educación a Distancia (RED), 21(65).

[8] Dumitru, C., Radovici, M. C. M., Rasiti, G., & Veselinović, L. (2023). Science and Learning in the Digital Era. Der Donauraum, 63(1-2), 83-98.

[9] Anderson, V. (2020). A digital pedagogy pivot: re-thinking higher education practice from an HRD perspective. Human Resource Development International, 23(4), 452-467.

[10] Remillard, J. T., Van Steenbrugge, H., Machalow, R., Koljonen, T., Krzywacki, H., Condon, L., & Hemmi, K. (2021). Elementary teachers' reflections on their use of digital instructional resources in four educational contexts: Belgium, Finland, Sweden, and US. ZDM–Mathematics Education, 53(6), 1331-1345.

[11] CEN European Committee for Standardization EN 16234-1:2021; e-Competence Framework (e-CF)—A common European Framework for ICT Professionals in all sectors—Part 1: Framework 2021. CEN/CENELEC: Brussels, Belgium, 2021

[12] Rathod, P., & Kämppi, P.. (2021). Empower Competencies for Online Learning in Higher Education: An European Union Innovation under European Commission Project (ECOLHE), Report

[13] Siemens, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2(1), 3-10.

[14] Bates, A. W. (2015). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus.

[15] Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. The International Review of Research in Open and Distributed Learning, 12(3), 80-97.

[16] Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), Instructional-design theories and models: A new paradigm of instructional theory (Vol. 2, pp. 215-239). Lawrence Erlbaum Associates.

[17] Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge University Press. https://doi.org/10.1017/CBO9780511815355

[18] Rovai, A. P. (2004). A constructivist approach to online college learning. Internet and Higher Education, 7(2), 79-93. https://doi.org/10.1016/j.iheduc.2004.02.001

[19] Palloff, R. M., & Pratt, K. (2007). Building online learning communities: Effective strategies for the virtual classroom (2nd ed.). Jossey-Bass.

[20] Garrison, D. R. (2017). E-Learning in the 21st century: A framework for research and practice. Routledge. https://doi.org/10.4324/9781315162862

[21] Mayer, R. E. (2014). The Cambridge handbook of multimedia learning. Cambridge University Press.

[22] Kämppi, P., & Rathod, P. (2020, October). Applying LEAN Principles to Improve Introductory Cybersecurity Online Course: Findings From the Pilot Study. In SITE Interactive Conference (pp. 73-79). Association for the Advancement of Computing in Education (AACE).

[23] European Commission. (2018). Digital Education Action Plan. Retrieved from https://ec.europa.eu/education/sites/education/files/digital-education-action-plan-jan2018_en.pdf

[24] European University Association. (2021). Roadmap for Digital Transformation of European Universities. Retrieved from https://eua.eu/resources/publications/1143:roadmap-for-digital-transformation-of-european-universities.html

[25] European Commission. (2020a). European Digital Strategy. Retrieved from https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-digital-strategy_en

[26] European University Association. (2021). Recommendations for the Digital Transformation of European Universities. Retrieved from https://eua.eu/resources/publications/1142:recommendations-for-the-digital-transformation-of-european-universities.html

[27] European Commission. (2020b). Shaping Europe's digital future. Retrieved from https://ec.europa.eu/info/publications/communication-shaping-europes-digital-future_en

[28] European University Association. (2019). EUA Trends 2019: Learning and Teaching in the European Higher Education Area. Retrieved from https://eua.eu/resources/publications/871:eua-trends-2019-learning-and-teaching-in-the-european-higher-education-area.html

[29] European Commission. (2020c). Building a European Data Economy. Retrieved from https://ec.europa.eu/digital-single-market/en/policies/building-european-data-economy

[30] European University Association. (2019). EUA Roadmap on Open Science 2021-2025. Retrieved from https://eua.eu/resources/publications/849:eua-roadmap-on-open-science-2021-2025.html

[31] European Commission. (2020d). White Paper on Artificial Intelligence. Retrieved from https://ec.europa.eu/info/publications/white-paper-artificial-intelligence-european-approach-excellence-and-trust_en

[32] European University Association. (2021). Policy Brief on Digital Education Transformation in European Universities. Retrieved from https://eua.eu/resources/publications/1144:policy-brief-on-digital-education-transformation-in-european-universities.html

[34] Voinea, C. L., & Roijakkers, N. (2023). Educating for the Future. In Futurology in Education and Learning (pp. 1-4).

Authors

Paresh Rathod is a seasoned technocrat, cyber expert, educator, and innovator. Currently, he is working as a thematic leader (Cyber RDI) and Senior Lecturer (ICT at Laurea). Paresh serves and contributes to diverse capacities as a technocrat, head of research and innovation at trustilio BV-Netherlands, co-chair of the European Cybersecurity Organisation (ECSO-Brussels) working group and European Cybersecurity Agency (ENISA) expert-rapporteur in AHWG (European Cybersecurity Skills Framework) and vice-president IITEDA (UK). In recent years, he has worked in the European innovation projects and industrial development work including ECHO, CyberSecPro, ARCSAR, EU-HYBNET, AI-ARC, ECOLHE and relevant projects. His development work and projects are contributing towards the goals of the cyber secure societies, digital single market, and next generation Europe. Paresh has trained more than 10 thousand professionals and higher education students in the Finland alone. Paresh Rathod's prime focus of the development includes integration of applied research, development and innovation oriented cyber secure and digital solutions working with international businesses, industries, communities, and professionals.

Pasi Kämppi is a cybersecurity professional and educator whose expertise covers various areas including telecommunications technologies, cyber security and professional training. His educational background covers B. Sc. (Telecommunications), MBA (Business IT) and Vocational Teacher Certification. He also holds many industrial certificates. He started his career in 1997 in Nokia Networks and worked for over 15 years in a high-tech environment. Since 2012 he has been working as project manager, researcher, and senior lecturer at Laurea University of Applied Sciences. Pasi has authored over 20 scientific articles. Currently he is working as a degree program coordinator (Business Information Technology) and full-time lecturer (Cyber Security) at Laurea University of Applied Sciences.