Advancing lifelong learning and professional development through ICT: insights from the 3L-Person 2023 workshop

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Abstract

The 3L-Person 2023 workshop provided a unique forum for researchers and practitioners from diverse backgrounds to explore the multifaceted role of information and communication technologies (ICT) in lifelong learning and professional development. Held in Kryvyi Rih, Ukraine, on October 25, 2023, the workshop showcased 11 high-quality papers that addressed a wide range of topics, including: personal learning environment design, advanced ICT for professional retraining and training in the workplace, and blended and remote learning/teaching with emerging ICT. The workshop facilitated lively discussions and networking opportunities among participants, who shared their experiences and insights on the emerging trends and issues in this interdisciplinary field. This paper presents a comprehensive overview of the 3L-Person 2023 workshop, including its theme, aims, topics of interest, program committee, accepted papers, and key outcomes.

Keywords

lifelong learning, professional development, ICT, personal learning environments, blended learning

1. Introduction

1.1. 3L-Person in a glance

The **International Workshop on Professional Retraining and Life-Long Learning using ICT: Person-oriented Approach** (3L-Person) is a peer-reviewed workshop. The workshop's goal is to bring together researchers and practitioners from the areas of Information/Communication Technologies (ICT) and Education/Training (E/T), to support the bridging process between ICT opportunities and education/training needs. ICT have a profound impact on education and training, offering new opportunities and challenges for learners, educators, and researchers. However, there is a need for a better understanding of the potential and limitations of these technologies, as well as the best practices and methodologies for their design and implementation. The workshop is cover such topics as ICT tools' design for: remote learning, adaptive learning, day-to-day support for individual's learning, synthetic learning environment, life-long learning of individuals, learning in the workplace, learning/training process of individuals with special needs, teaching/learning safety and security, vocational training and carrier guiding, etc.

The workshop is also address the issues of time, space, and cultural differences of learners and teachers, and how ICT can help to overcome them. The specific goal of this activity is to facilitate a broader understanding of the promise and pitfalls of these technologies and working (learning/teaching) environments in global education/development settings, with special regard to the human as subject in the system and to the integration of humans with the technical, didactic, and organizational subsystems.

Figure 1: 3L-Person logo.

1.2. 3L-Person aims

The workshop aims to achieve the following objectives:

1. The identification of needs and opportunities in which coordinated research efforts are required to expand and understand the emerging technologies in education (such as cloud computing, mobile tools and services, network infrastructures, systems of computer modeling, simulation, AR/VR/MR etc.), their effectiveness, the potential risks, and the potential benefits of new ways to educate, learn and collaborate.
2. The presentation and discussion of novel ICT solutions in E/T that can support and enhance lifelong learning and professional development of individuals and organizations.
3. The dissemination of information and experiences about the current trends and future prospects of global education in the near future, and how ICT can facilitate them.

1.3. 3L-Person topics of interest

3L-Person topics of interest since 2019 [1, 2, 3]:

- **Personal Learning Environment Design**: person-oriented tools, adaptive and intuitive learning, cloud-based learning environment, social networking, etc.
- **Advanced ICT for Professional Retraining and Training in the Workplace**: cloud-based learning tools, mobile-based learning, learning networking tools, etc.
- **Blended and Remote Learning/Teaching with Emerging ICT**: remote learning and virtual classroom, flipped classroom, network-oriented collaborative learning, home-schooling, etc.
- **Educational Robots, Databases and Language Technologies for Open Learning and Research**: innovative and intelligence tools for data analysis; network labs, robotics learning tools; augmented cognition; machine learning; open learning and research platforms etc.
- **ICT in Education of a Person with Special Needs**: openness and accessibility of education, e-inclusion; using ICT in educating gifted, underachieved, disabled individuals; ICT for a human development, etc.
- **ICT in Education Safety and Security**: human-system integration, human factors, quality evaluation of electronic learning resources, etc.
- **ICT-support of STEM Education and Professional Career**: network labs, robust intelligence, synthetic environment, augmented cognition, 3D technology, systems of computer modeling and simulation, etc.
- **Synthetic learning environment**: AR/VR/MR, AI in education, computer modeling in teaching process etc.

This volume contains the papers presented at the VIII International Workshop on Professional Retraining and Life-Long Learning using ICT: Person-oriented Approach (3L-Person 2023) held on October 25, 2023 in Ukraine.

The workshop received 14 submissions. Each submission was reviewed by at least 3 program committee members. Based on the reviews, 11 papers were accepted for this volume as regular papers.

2. Program committee

- *Marc Baaden*, CNRS, France [4]
- *Pablo Garcia Bringas*, University of Deusto, Spain [5]
- *Nadire Cavus*, Near East University, North Cyprus [6]
- *El-Sayed M. El-Horbaty*, Ain Shams University, Egypt [7]
- *Ramón Fabregat*, University of Girona, Spain [8]
- *Irina Georgescu*, Bucharest University of Economics, Romania [9]
- *Mustansar Ali Ghazanfar*, University of East London, United Kingdom [10]
- *Anita Goel*, University of Delhi, India [11]
- *Carina Soledad González-González*, Universidad de La Laguna, Spain [12]
- *Sven Hartmann*, Clausthal University of Technology, Germany [13]
- *Michail Kalogiannakis*, University of Thessaly, Greece [14]

- *Francesco Lelli*, Tilburg University, Netherlands [15]
- *Chung-Sheng Li*, PwC, United States [16]
- *Piotr Lipiński*, Lodz University of Technology, Poland [17]
- *Alessandra Lumini*, University of Bologna, Italy [18]
- *Rashid Mehmood*, King Abdulaziz University, Saudi Arabia [19]
- *Vincenzo Moscato*, University of Naples "Federico II", Italia [20]
- *Thomas Moser*, St. Pölten University of Applied Sciences, Austria [21]
- *Ranesh Kumar Naha*, University of Tasmania, Australia [22]
- *Stamatios Papadakis*, University of Crete, Greece [23]
- *Michael M. Resch*, HLRS, University of Stuttgart, Germany [24]
- *Nina Rizun*, Gdańsk University of Technology, Poland [25]
- *Abdel-Badeeh M. Salem*, Ain Shams University, Egypt [26]
- *Demetrios G. Sampson*, University of Piraeus, Greece [27]
- *Antonio Sarasa-Cabezuelo*, Universidad Complutense de Madrid, Spain [28]
- *Prem Kumar Singh*, Gandhi Institute of Technology and Management, India [29]
- *Daniel Thalmann*, Swiss Federal Institute of Technology in Lausanne, Switzerland [30]
- *Longkai Wu*, National Institute of Education, Singapore [31]
- *Eftim Zdravevski*, University Ss Cyril and Methodius, Macedonia [32]

3. 3L-Person 2023 organizers

The 8th edition of the International Workshop on Professional Retraining and Life-Long Learning using ICT: Person-oriented Approach (3L-Person) was meticulously coordinated by the Academy of Cognitive and Natural Sciences (ACNS), a non-governmental organization dedicated to nurturing the growth of researchers' expertise in the cognitive and natural sciences arena. ACNS's mission encompasses enhancing research, safeguarding rights and liberties, and catering to professional, scientific, social, and various other interests.

ACNS is engaged in a spectrum of activities, including:

- Spearheading research initiatives within the cognitive and natural sciences domain and fostering collaborative ties among researchers [33, 34].
- Orchestrating conferences, workshops, training sessions, internships, and other platforms for the exchange and dissemination of knowledge in the realm of cognitive and natural sciences [35, 36].
- Publishing scientific journals, conference proceedings, collections of scholarly works, and related materials (https://acnsci.org/cms/journals/).

Among ACNS's prominent publications is the Diamond Open Access journal titled *Educational Technology Quarterly* (ETQ) [37], a peer-reviewed journal delving into the ways digital technology can enrich the field of education. Notably, ETQ covers a broad range of topics aligned with 3L-Person topics of interests:

- *Personal Learning Environment Design*: person-oriented tools, adaptive [38] and intuitive learning, cloud-based learning environment [39, 40, 41, 42, 43, 44, 45], social networking [46], etc.
- *Advanced ICT for Professional Retraining and Training in the Workplace*: cloud-based learning tools, mobile-based learning, learning networking tools, etc. [47]
- *Blended and Remote Learning/Teaching with Emerging ICT*: remote learning [48, 49, 50, 51, 52, 53, 54] and virtual classroom [55, 56, 57], flipped classroom [58], network-oriented collaborative learning, homeschooling, etc.
- *Educational Robots, Databases and Language Technologies for Open Learning and Research*: innovative and intelligence tools for data analysis [59]; network labs, robotics learning tools [34]; augmented cognition; machine learning [60]; open learning and research platforms etc. [33]
- *ICT in Education of a Person with Special Needs*: openness and accessibility of education, e-inclusion; using ICT in educating gifted, underachieved, disabled individuals; ICT for a human development, etc. [61]
- *ICT in Education Safety and Security*: human-system integration, human factors, quality evaluation of electronic learning resources, etc. [62, 63]
- *ICT-support of STEM Education and Professional Career*: network labs, robust intelligence, synthetic environment, augmented cognition, 3D technology, systems of computer modeling and simulation, etc. [64, 65, 66, 67]
- *Synthetic learning environment*: AR/VR/MR [68, 69, 70, 71, 72, 73, 74, 75, 76], AI in education, computer modeling in teaching process [77], etc.

4. Articles overview

The article titled "*The use of digital technology in general secondary education in Ukraine: current state and future prospects*" by Vakaliuk and Antoniuk [78] presents an analysis of the current state of implementation of information and communication technologies (ICT) in the educational process of general secondary education institutions in Ukraine. The authors conducted a survey among students of the first year of Zhytomyr Polytechnic State University in 2019 and 2020 to collect data on the use of ICT in the educational process. The survey consisted of 17 questions related to the use of ICT in education.

The authors found that the use of digital technology in various fields of education is one of the most important trends in the educational process worldwide. The study revealed that the level of ICT implementation in general secondary education institutions in Ukraine is low. The authors suggest that the introduction of the discipline "Educational technologies and digital education" into the training of future information technology specialists would be beneficial. They also recommend a certification educational program "Information systems and cloud technologies in the educational process" designed for general education teachers, educators for higher education institutions, experts in the field of additional educational services, and other professionals.

The article provides a comprehensive overview of the current state of ICT implementation in Ukrainian general secondary education institutions. The authors have conducted a survey

among students to collect data on the use of ICT in education, which is a reliable source for understanding the current state. The study reveals that there is a need for more extensive use of digital technology in education. The authors suggest that introducing a new discipline "Educational technologies and digital education" into the training program for future information technology specialists would be beneficial. This would help to improve their skills and knowledge related to digital technology, which they can then apply to their work as teachers or educators.

Moreover, the authors recommend a certification educational program "Information systems and cloud technologies in the educational process" designed for general education teachers, educators for higher education institutions, experts in the field of additional educational services, and other professionals. This program would help them acquire knowledge and skills related to information systems and cloud technologies, which are essential for effective implementation of ICT in education.

The article titled "*Interactive teaching methods with visualization for technical and economic students*" by Mikhailutsa et al. [79] presents an analysis of the benefits of using interactive teaching methods for students of technical and economic specialties using visualization as an example. The authors analyze existing innovative educational methods and focus on the use of information technology in the formation of competencies of future specialists. They also implement a visualization of the ant colony optimization algorithm to solve logistic problems that are of practical importance for both economic and technical areas.

The authors suggest that interactive teaching methods using visualization can help students acquire knowledge and skills related to information systems and cloud technologies, which are essential for effective implementation of ICT in education. The study provides valuable insights into the use of digital technology in education and suggests ways to improve it.

The article provides a comprehensive overview of innovative methods of information visualization in transport logistics and training organization. It highlights the importance of using interactive teaching methods for students to acquire knowledge and skills related to information systems and cloud technologies.

The article titled "*Enhancing foreign language learning with cloud-based mind mapping techniques*" by Amelina et al. [80] explores the use of mind maps in the context of foreign language learning. It highlights the growing importance of foreign language proficiency and the challenges students face in mastering vocabulary, grammar, and communication skills. Mind maps, typically associated with brainstorming, are presented as a valuable tool for visualizing and learning the structure of foreign languages.

The study reviews the existing literature on modernizing foreign language education and emphasizes the importance of practical and accessible tools for both teachers and students. It references the work of Tony Buzan, who developed mind maps as a means to represent information in a non-linear and associative way, allowing for a holistic view of ideas and concepts.

The research further examines the functionality of various cloud-based services for creating mind maps, emphasizing factors like cost, user-friendliness, compatibility, teamwork capabilities, templates, and integration with common applications.

The study demonstrates how mind maps can be effectively used in foreign language learning. It shows how they help structure and visualize vocabulary, grammar rules, and thematic content.

Students are encouraged to create their own mind maps, which can be tailored to their individual learning styles and needs.

Several examples of mind maps are presented, including one for grammar, vocabulary, and essay writing in a foreign language. The research indicates that mind maps can be powerful tools for students to organize their thoughts, remember information, and improve their language skills.

A survey of students' preferences for cloud services for creating mind maps is included, with Ayoa, Miro, and Mindomo being favored for various language learning tasks. The study concludes that students found mind maps to be valuable for their language learning and that Ayoa was the most preferred cloud service.

The article titled "*Designing and evaluating ESP courses on Moodle for enhancing language skills in online learning*" by Shalatska et al. [81] presents an analysis of the benefits of using Moodle as a platform for organizing a Business English course for specific purposes. The authors analyze the existing innovative educational methods and focus on the use of information technology in the formation of competencies of future specialists.

The authors suggest that Moodle is an effective platform for organizing a Business English course for specific purposes. They provide a detailed description of the course structure and content, including the use of multimedia materials, interactive exercises, and online communication tools. The course is designed to develop participants' skills in designing, implementing, and evaluating English for Specific Purposes (ESP) courses based on effective practices in the field.

The article titled "*An algorithm for compiling an electronic multilingual terminological dictionary*" by Vakaliuk et al. [82] presents an algorithm for compiling an electronic multilingual terminological dictionary. The authors analyze the existing innovative educational methods and focus on the use of information technology in the formation of competencies of future specialists.

The authors suggest that electronic multilingual terminological dictionaries are essential tools for fostering cross-cultural professional communication and contributing to society's advancement. They provide a detailed description of the algorithm for compiling such a dictionary, which includes seven stages dedicated to register creation and arrangement, information system creation and trial, as well as dictionary set-up. All stages are interconnected and interrelated. Accordingly, meticulous stages completion significantly contributes to quality electronic multilingual terminological dictionary compilation.

The article titled "*English language training for IT professionals at Ukrainian universities: pedagogical conditions and content*" Symonenko et al. [83] presents a content analysis of course books and online courses for teaching English for specific purposes (ESP) for IT professionals. The authors aim to identify the peculiarities of professional training of IT specialists at higher education institutions with a focus on foreign language training. They also analyze the pedagogical conditions for the formation of the communicative competence of IT professionals.

The authors conducted a content analysis of existing English course books, textbooks, and online courses for IT professionals to find out the content of foreign language training. They found that English language teaching aids in information technology, computer engineering, computing, and software engineering can be used in the learning process. However, their use requires thorough refinement and modification.

The paper concludes that foreign language communication competence is a decisive factor in employment and career development in the IT field. The authors suggest that universities should incorporate project-based learning, brainstorming, gamification, and discussion to enhance the communication abilities of IT professionals, with a particular emphasis on English language instruction.

The article titled "*Adaptive learning system based on cognitive independence*" by Lavrov et al. [84] presents an analysis of factors that influence the cognitive independence of students in e-learning environments. The authors aim to identify the factors that impact the effectiveness of e-learning and to develop a model for ensuring the effectiveness of e-learning based on online technology.

The authors conducted a survey of 469 students enrolled in online education to analyze the factors that influence cognitive independence. They found that the effectiveness of e-learning depends on several factors, including student and instructor self-efficacy, attitudes, and confidence in using the technology involved; the educational strategies employed; the ability to monitor and evaluate educational outcomes; and student motivation, among many others.

The paper concludes that cognitive independence is a critical factor in ensuring the effectiveness of e-learning. The authors suggest that universities should focus on developing appropriate learning strategies for individual needs, including project-based learning, gamification, and discussion. They also recommend that universities should provide students with access to online resources and support services to enhance their cognitive independence.

The article titled "*Informatization of education: driving force for integration of modern higher education in the global information space*" by Fedorenko et al. [85] discusses the integration of modern higher education into the global information space. The authors aim to identify the main trends and challenges of this integration and to develop a model for the effective implementation of modern information technologies in higher education.

The authors conducted a comprehensive analysis of the current state of higher education in Ukraine and identified the main trends and challenges of its integration into the global information space. They found that the integration of modern higher education into the global information space is a complex process that requires significant changes in the educational system, including the development of new educational programs, the introduction of innovative teaching methods, and the use of modern information technologies.

The paper concludes that the integration of modern higher education into the global information space is essential for ensuring the competitiveness of universities in the global market. The authors suggest that universities should focus on developing appropriate strategies for integrating modern information technologies into their educational programs. They also recommend that universities should provide students with access to online resources and support services to enhance their learning experience.

The article titled "*Structuring and visualizing fictional and real life empirical concepts with emoji symbols: a case study of José Ángel Buesa's poetry and Borys Grinchenko's image*" by Makhachashvili et al. [86] presents a study on the applied technology of fiction and non-fiction conceptual presentation via ICT tools. The authors aim to explore the pedagogical function of graphic mimesis in the presentation of fictional and non-fictional concepts.

The authors conducted a study to investigate the effectiveness of graphic mimesis in the presentation of fictional and non-fictional concepts. They found that graphic mimesis can be an

effective tool for presenting complex concepts in a simple and understandable way. The authors also suggest that graphic mimesis can be used to enhance students' creativity, imagination, and critical thinking skills.

The paper concludes that graphic mimesis has significant potential as a pedagogical tool for teaching complex concepts in an engaging and interactive way. The authors suggest that universities should incorporate graphic mimesis into their educational programs to enhance students' learning experience.

The article titled "*Multilevel continuing professional teaching for vocational education specialists*" by Voitovych et al. [87] discusses the importance of information culture in vocational education and how it can be developed among vocational education specialists. The authors argue that information culture is an essential component of vocational education, and it is necessary to develop it among vocational education specialists to improve the quality of vocational education.

The authors begin by defining information culture and its importance in vocational education. They then discuss the challenges faced by vocational education specialists in developing information culture and propose a framework for developing information culture among vocational education specialists. The framework includes three stages: diagnosis, development, and evaluation.

The authors also discuss the results of a survey conducted among vocational education specialists to identify their level of information culture. The survey results indicate that vocational education specialists have a low level of information culture, which highlights the need for developing information culture among them.

The article titled "*ICT for food safety education: a case study of an Erasmus+ Jean Monnet Module on EU food safety control*" by Galaburda et al. [88] discusses the use of information and communication technologies (ICT) in the application, dissemination, and evaluation of Erasmus+ Jean Monnet activities.

The authors begin by providing an overview of the importance of ICT in education and how it can be used to enhance the quality of education. They then discuss the Erasmus+ Jean Monnet program and its objectives. The authors argue that ICT can be used to achieve the objectives of the program by facilitating the application, dissemination, and evaluation of Jean Monnet activities.

The authors then describe a new training module on EU Food Safety Control that was developed and implemented at the Department of Veterinary and Sanitary Examination of NULES using ICT. The module was designed to contribute to a better understanding of the applied system of European food safety assurance and the objectives of official food control at EU level within the frameworks of different types of competencies.

The authors also discuss the results of a survey conducted among participants to evaluate the effectiveness of the educational course on food safety control. The survey results indicate that participants' knowledge improved significantly after completing the module.

The paper also highlights how ICT can be used to achieve the objectives of Erasmus+ Jean Monnet activities by facilitating their application, dissemination, and evaluation.

5. Conclusion

The 3L-Person 2023 workshop provides a unique opportunity for researchers and practitioners from various fields and regions to exchange ideas and experiences on the use of ICT for lifelong learning and professional development. The goal of 3L-Person 2023 is to create a forum for presenting and discussing the latest research findings, innovative solutions, and best practices in this interdisciplinary field. The workshop also promotes collaboration and networking among participants, who will benefit from the exchange of knowledge and feedback.

We are grateful to all authors who submitted papers and to the delegates for their participation and interest in 3L-Person as a platform for sharing their ideas and innovations. We also thank all program committee members for their continuous guidance and the efforts of peer reviewers who helped improve the quality of papers. The constructive criticism, improvements, and corrections provided to authors are greatly appreciated for their contribution to the success of the conference.

The conference management system used by 3L-Person 2023 was developed by the *Not So Easy Science Education* platform (https://notso.easyscience.education) and the Academy of Cognitive and Natural Sciences (https://acnsci.org). This comprehensive system facilitated the entire process from calling for papers, inviting reviewers, handling paper submissions, communicating with authors, etc. We are grateful to these organizations for making it possible to use this excellent resource.

Finally, we would like to acknowledge that Ukraine has been facing a difficult time due to the ongoing war in the country. Despite these challenges, the 3L-Person 2023 workshop serves as a testament to the resilience of Ukraine's scientific community.

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