

From digital strategies to innovative integration: advancing educational practices through technology at DigiTransfEd 2024

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Abstract

This is an introductory article from the workshop co-chairs to the collection of selected papers of the Workshop on Digital Transformation of Education (DigiTransfEd 2024), held in Lviv, Ukraine, on September 23, 2024. The volume presents contributions to workshops related to ICTERI 2024: The 19th International Conference on ICT in Education, Research and Industrial Applications. The workshop covers such topics as digital transformation strategies for educational institutions, development of digital resources for education, assessment and evaluation of digital learning environments, integrating digital technologies in teaching and learning, online and blended learning models, student engagement and motivation in online learning, teacher training and professional development for digital transformation, gamification and game-based learning in digital education, innovative technologies and tools for digital education, digital learning environments for cooperation, collaboration and communication, and others. The workshop materials include an introduction and 11 submitted papers carefully reviewed and selected from 27 submissions.

Keywords

ICTERI 2024, Digital Transformation of Education, ICT in Technology Enhanced Learning, Tools for Technology Enhanced, Modelling Systems in Education

1. Introduction

The DigiTransfEd 2024 workshop, in conjunction with ICTERI 2024, focuses on digital transformation in education, a subject of paramount importance worldwide. While ICTERI's Track 3 centres on ICT solutions for competence design and development, technology-enhanced learning, and ICT infrastructures for research and collaboration, DigiTransfEd uniquely emphasizes the theory and practice of transforming education through digital means. For the third consecutive year, this peer-reviewed international workshop brings together experts and researchers to explore the challenges and opportunities associated with digitalizing educational processes at all levels.

The COVID-19 pandemic marked a turning point in the evolution of digital education, revealing both the potential and the necessity of digital tools and platforms for effective teaching and learning. Before the pandemic, the impact of digital transformation on education had been relatively modest compared to other sectors. However, as educational institutions were forced to adapt rapidly to remote and hybrid models, the importance of a digitally resilient education system became undeniable. DigiTransfEd

DigiTransfEd 2024: 3rd Workshop on Digital Transformation of Education, co-located with the 19th International Conference on ICT in Education, Research, and Industrial Applications (ICTERI 2024, September 23-27, 2024, Lviv, Ukraine)

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2024 addresses the ongoing need for education systems that are fit for the digital age and capable of withstanding unforeseen global challenges.

DigiTransfEd 2024 encouraged researchers and educators to join a meaningful discussion about how digital transformation can improve education systems, ensure equity, and support the changing needs of learners in an increasingly complex world. The workshop became a platform for solving one of the most urgent problems facing education today: integrating digital technologies to prepare for the future while maintaining the quality and integrity of the educational experience.

2. Themes and aims of the DigiTransfEd 2024

The main objectives of the DigiTransfEd workshop (figure 1) were to explore the theory and practice of digital transformation in education and address the global challenges associated with this change. The workshop authors explored how digital technologies can improve education systems, particularly during unpredictable global crises such as the COVID-19 pandemic and the war in Ukraine.



Figure 1: The DigiTransfEd 2024 logo.

We observed the participants' (figure 2) desire to contribute to the dialogue about the development of sustainable, advanced digital educational processes at all levels and disciplines. In addition, the workshop encourages researchers, postgraduates, and academics to share ideas on integrating digital tools in teaching, learning, and educational management to promote best educational practices.

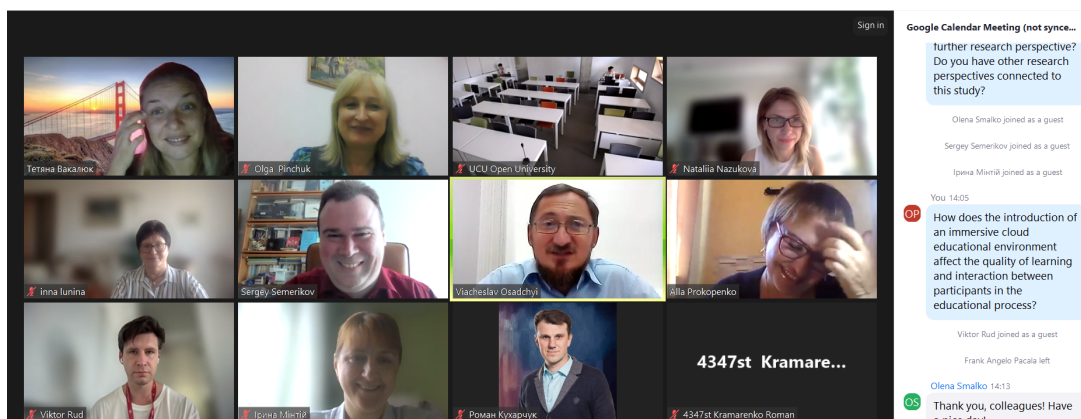


Figure 2: Participants' of DigiTransfEd 2024 workshop [1]

DigiTransfEd topics include, but are not limited to, the following:

- digital transformation strategies for educational institutions,
- develop digital resources for education,
- digital educational resources and practices,
- assessment and evaluation of digital learning environments,

- integrating digital technologies in teaching and learning,
- online and blended learning models for K-12 and higher education,
- student engagement and motivation in online learning,
- teacher training and professional development for digital transformation,
- ethical and social implications of digital transformation in education,
- gamification and game-based learning in digital education,
- innovative technologies and tools for digital education,
- adaptive learning technologies,
- digital transformation and educational equity,
- digital citizenship and digital literacy in education,
- digital learning environments for cooperation, collaboration and communication.

3. Interesting topics of the workshop

Based on the keywords identified by the authors in their reports, the research interests of the workshop participants could be divided into the following clusters:

1. Digital Transformation & Education.
2. Pedagogy & Teacher Development.
3. Military Education.
4. Physics & STEM Education.
5. Data Science & Machine Learning in Education.
6. Higher Education.

Each cluster groups together related keywords thematically or by their specific domain (figure 3).

DigiTransfEd-2024 Session 1. The first session of the workshop was presented by four reports: Development of digital competence of the military leadership officers in the system of advanced training: a pedagogical experiment [2]; Design of MOOC “Innovative Teaching: Essentials of Digital Creativity and Hybrid Learning” for providing micro-credential for educators [3]; Professional development of teachers in conditions of digital transformation of postgraduate pedagogical education [4] (figure 4); Gamification method using Minecraft for training future teachers of computer science [5]. The reports highlight different but interconnected aspects of Digital transformation, from developing digital competence in military leadership to integrating gamification in computer science education. Together, these reports illustrate the diverse ways digital transformation reshapes educational landscapes. All four reports emphasize the importance of developing digital competence across different educational sectors.

In the first report [2], military leadership officers are trained to enhance their digital competence, a critical skill for modern military operations.

In the second [3] and third [4] reports, educators are the focus, with professional development programs and digital tools designed to improve their digital literacy and teaching methods in both regular and postgraduate education.

The fourth report [5] explores how digital games like Minecraft can be used to teach programming, indicating a push toward enhancing digital competence among students, particularly future computer science teachers.

The integration of digital technologies leads to pedagogical innovations in all the reports. Each report is grounded in empirical research, with experiments, surveys, or data analysis to validate the effectiveness of the proposed digital tools or methodologies.

DigiTransfEd-2024 Session 2. The second session of the workshop was also presented with four reports: Technologies and algorithms for the implementation of the recommendation system for creating an individual study plan for a higher education student [6]; Visual Modeling Technologies in the Mathematical Training of Engineers in Modern Conditions of Digital Transformation of Approaches to Creating Visual Content [7]; Intelligent Parametric Educational Web Platform System Design [8]

a 24/7 mode. One way or another, all the participants of the second session discussed the problem: how technology can be used to solve problems in education, personalize the learning experience, make educational content more attractive, and make learning more effective for students.

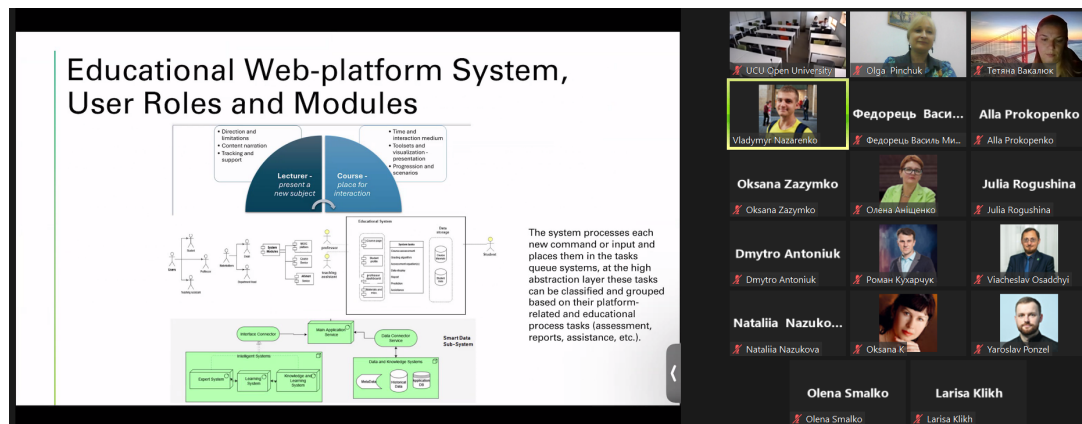


Figure 5: Screenshot of the report by Volodymyr Nazarenko [8].

DigiTransfEd-2024 Session 3. Three reports were presented at the last session of the workshop: School Digitalization Indicators in Educational Equity Analysis [10], Developing and Validating an Integrated Three-Tier Multiple Choice Test for Smartphone-based Experiments in Physics [11], Immersive cloud-based educational environment of the university: Principles of design [12].

Collectively, these studies offer valuable insights into how technology can enhance educational equity, improve learning outcomes, and prepare students for the challenges of the 21st century.

The first article [10] highlights the importance of digital accessibility in ensuring equitable educational opportunities and emphasizes its critical role in ensuring educational equity in Ukraine, particularly in general secondary education.

The originality of the second research [11] lies in its development of an innovative assessment tool that identifies the alternative conceptions of teachers and provides a basis for targeted interventions through continuing professional development. This article is closely aligned with the theme of digital competence development, highlighting how innovative tools and assessments can be used to enhance teaching and learning.

The innovation of the authors of the third report [12] (figure 6) was revealed in their holistic vision of an immersive learning environment that combines advanced technological solutions with pedagogical principles focused on the individualization of learning and the professional development of future specialists.

So, the results of these three studies trace several key themes:

- the importance of developing the digital competence of teachers,
- the role of digital tools in increasing educational equality,
- integration of innovative technologies into the learning process.

Each article approaches these topics from different perspectives – whether through policy analysis, the creation of assessment tools, or the design of engaging learning environments – but together, they highlight the transformative potential of digitization in education.

4. Program Committee of DigiTransfEd 2024

The DigiTransfEd2024 workshop assembled a distinguished program committee, which included experts from renowned educational and scientific institutions worldwide. These institutions represent various disciplines and geographic locations, reflecting the global importance of digital transformation in education.

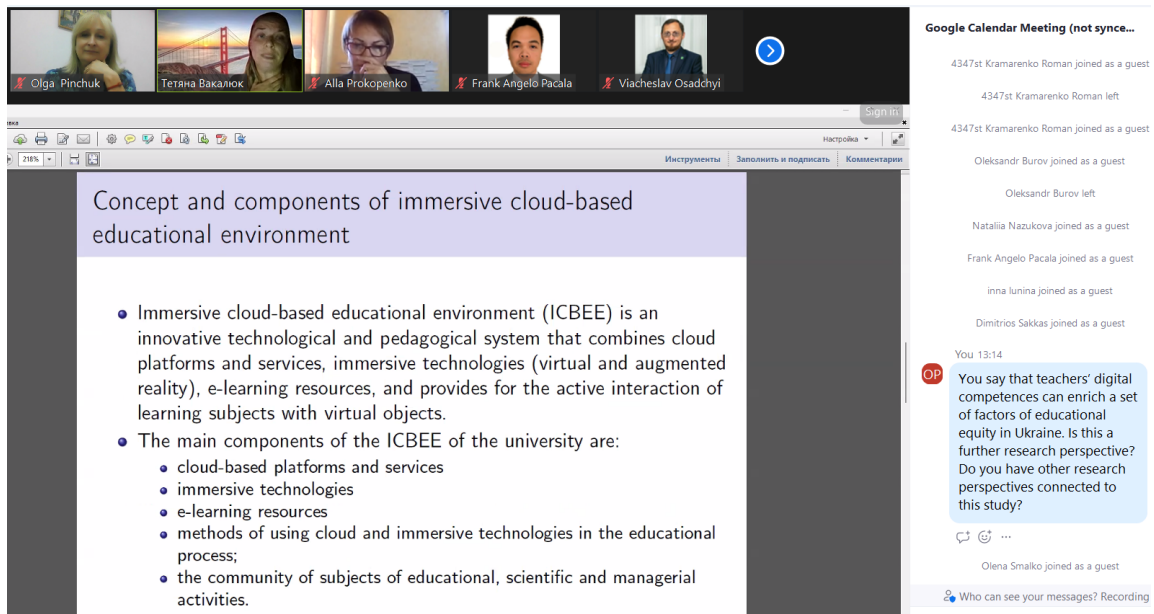


Figure 6: Screenshot of the report by Tetiana A. Vakaliuk [12].

The committee included leading academics from renowned institutions recognized for their cutting-edge research in digital, including education and technology. The participation of representatives from Ukraine underlines the crucial role that Ukrainian scientists play in the current situation in response to the constant challenges associated with digitization during wartime.

Institutions from Europe are well represented, including the University of Vienna in Austria, the Near East University, North Cyprus and the University of Girona in Spain, the Technical University of Lodz in Poland, Tilburg University in the Netherlands, University of Bologna in Italy, Clausthal University of Technology, Germany, and the Swiss Federal Institute of Technology in Lausanne, among others. Such institutions have made significant contributions to understanding educational processes in the digital age, and their participation ensures that the committee can offer a broad perspective on the subject. The University of Crete, Greece, and the University of Piraeus, Greece, are making significant contributions to research in adaptive learning technologies and innovative educational tools, further enriching the peer review committee's capacity.

In addition to Europe, the committee includes experts from universities in India, the United Kingdom, the United States, Australia, Egypt, and Saudi Arabia, who express different views on the global transformation of education. This diversity emphasizes the international reach of the workshop and its relevance to different educational contexts and challenges, demonstrating the desire to integrate as established as well as new voices in the discourse of digital education.

The committee played a crucial role in ensuring the high quality of the workshop papers and reports by offering expert reviews and evaluations. Their broad expertise in digital citizenship, online learning models, gamification, and the ethical implications of digital education make them critical contributors to advancing research in this field. The participation of experts from the world's leading institutions ensures that the workshop results reflect the latest and most relevant developments in digital education, ultimately contributing to a deeper understanding and further development of this transformative field of research.

Program Committee Co-Chairs

- Tetiana Vakaliuk, Zhytomyr State Polytechnic University, Ukraine
- Viacheslav Osadchyi, Borys Grinchenko Kyiv University, Ukraine
- Olha Pinchuk, Institute for Digitalisation of Education of the National Academy of Educational Sciences of Ukraine, Ukraine

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- Daniel Thalmann, Swiss Federal Institute of Technology in Lausanne, Switzerland
- Longkai Wu, National Institute of Education, Singapore
- Eftim Zdravevski, University Ss Cyril and Methodius, Macedonia

5. Conclusion

This volume represents the proceedings of the International Workshop on Digital Transformation of Education (DigiTransfEd 2024), held in Lviv, Ukraine, on September 23, 2024.

It comprises 11 contributed papers [2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12] that have been carefully peer-reviewed and selected from 27 submissions.

DigiTransfEd has received 27 submissions, including full research articles, discussion, survey, or problem analysis papers, and short/research articles. Applications for the workshop were subject to requirements regarding the originality of the scientific contribution to solving the problem, a clear vision of the authors of their scientific task against the background of modern research, and publications in the field of study. Papers should be unpublished and not submitted for publication in other publications at the time of evaluation for this workshop. At least three program committee members reviewed each application, checking for plagiarism/self-plagiarism and honest citation of the work of other authors. The co-chairs of the program committee also carefully analyzed each submission.

The selection of articles took place in three stages. Initially, according to the expert's assessment, the Program Committee Co-Chairs selected 11 out of 27 articles for inclusion in the workshop program. Each of them was discussed during the presentation of research materials in English. In conclusion, the workshop organizers reviewed the quality of finalizing the articles' texts per the recommendations and comments of experts—members of the international program committee.

Thus, 11 articles have remained, of which 3 papers have been accepted as Short Papers, and 8 papers have been accepted as Full Papers.

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