JOURNAL

of NON-FORMAL *and*

DIGITAL EDUCATION

INNOVATION

FUTURE

TRANSFORMATION

ACCESIBILITY

JOURNAL
of NON-FORMAL *and* DIGITAL EDUCATION

TABLE OF CONTENTS

SCIENTIFIC COMMITTEE

Prof. Anghelina Dudan - Carol I Commercial College, Constanța

Eng Mykyta Chervinskyi - Researcher and Master of Science, TEAM4Excellence

Prof. Dr. Melia-Ana Abdula – Ghe Duca Technological High School, Constanta

Prof. Ioana Mihaela Barbu – Poet Ovidiu Gymnasium School, Ovidiu

Prof. Constantin Orzan - Decebal Highschool, Constanța

Prof. Liliana Octavia Pascu - Mihai Viteazul Gymnasium School, Constanța

Prof. Adriana Grozavu - B.P. Hasdeu Gymnasium School, Constanta

Prof. Teodora Mandrea - "Stefan Procopiu" Highschool, Vaslui

Prof. Cristina Iordache - Secondary School No. 29 "Mihai Viteazul", Constanta

Prof. Gina Vintila - Technological High School of Electrotechnics and Telecommunications, Constanta

Prof. Gabriela Hugeanu - B.P. Hasdeu Gymnasium School, Constanta

Prof. Dr. Anca Ionescu (Trișcă), - „Jean Bart", Theoretical Highschool, Sulina

Prof. Cristina Tobă - Tudor Arghezi Gymnasium School, Năvodari

Prof. Georgiana Elisabeta Baciu - „Constantin Brâncoveanu" School, Râmnicu Sărat, Buzău

Prof. Georgeta Covaci - „Ion Creangă" Kindergarten Slatina, Olt, Romania

Prof. Eugenia Olguța Cotulbea - Mihai Viteazul High School, Caracal, Romania

EDITORIAL

The Journal of Non-Formal and Digital Education is an open-access publication dedicated to exploring innovative approaches in education, with a special focus on non-formal learning, digital methodologies, and interdisciplinary teaching strategies.

We are dedicated to enhancing the visibility and impact of research in innovative education. Through our Web-First initiative, we ensure that research results reach the global education community as soon as it is peer-reviewed and accepted, allowing for immediate visibility and engagement.

Key benefits of Web-First include:

✓ Rapid dissemination – Authors can share their findings without waiting for full issue publication.

✓ Increased visibility – Articles become indexed and citable upon online release.

This approach accelerates the impact of research, providing timely access to studies in non-formal and digital education.

By publishing peer-reviewed articles, we strive to provide a platform for educators and researchers to share their insights on how digital tools, innovative methodologies, and interdisciplinary approaches can shape the future of learning.

We welcome submissions from educators, researchers, and industry experts committed to advancing sustainability, technology-driven education, and innovative teaching approaches.

A cross-country study on integration of artificial intelligence in education

Nicoleta Acomi[1], Ovidiu Acomi[2]*

[1]Constanta Maritime University, Romania
[2]TEAM4Excellence Association, Romania
*Corresponding author: ovidiu.acomi@team4excellence.ro

Abstract. The integration of Artificial Intelligence (AI) in non-formal, informal and formal education is an emerging area with great potential to transform the world. However, the capacity of educators, youth workers and teachers to capitalise on this potential remains limited due to a lack of well-defined frameworks for AI integration in practices. The scope of this study is to explore the needs, challenges, and perspectives of youth work professionals regarding AI integration.

The research methodology employed mixt research methods. The literature review was followed by four semi-structured focus groups involving 72 youth workers and professionals with diverse backgrounds, nationalities and experience levels. A common guideline was used to ensure consistency, including facilitator instructions, discussion prompts, and reporting templates. The data collected during the focus groups were analysed using a Computer-Assisted Qualitative Data Analysis Software (CAQDAS), ATLAS.ti software dedicated to qualitative research. The authors conducted qualitative analysis, through coding, identification of main categories, thematic map for visualization of results, and interpretation of findings to uncover patterns and deeper insights.

The results revealed a generally positive attitude toward AI tools and an awareness of their potential benefits in youth work, particularly in content creation. However, participants reported significant challenges regarding the use of AI for administrative tasks efficiency, for personalised learning, ethical concerns, and difficulty in interpretation of data. Cross-country similarities emerged, suggesting a shared need for capacity building and continuous training, while differences highlighted the influence of national contexts and digital infrastructure.

This study provides a foundational understanding of the competence needs of youth workers in relation to AI adoption. The findings are relevant for course designers wishing to offer targeted training for youth workers. Future research is also needed into policy-level support mechanisms that can enhance AI literacy and ethical integration across the sector.

Keywords: digital education; artificial intelligence; ATLAS.ti; professional development.

1. Introduction

The rapid development of Artificial Intelligence (AI) and its integration into various sectors has transformed the ways in which organisations operate, communicate, and deliver services. The youth work sector plays a crucial role in empowerment and development, positioning AI-related skills as increasingly essential for both professional and personal growth. Youth work is a broad term that encompasses a wide range of social, cultural, educational, and political activities

carried out by, with, and for young people (COE, 2020). Although situated within the sphere of "out-of-school" education (COE, 2020), youth work is, above all, an educational and developmental process (NYCY, 2020). Positioned outside the constraints of the formal education system, youth workers often enjoy greater flexibility to experiment with digital technologies and respond proactively to the evolving needs of young people. However, this degree of freedom also presents risks and challenges, including a lack of consistent support, strategic regulation, and up-to-date digital safety monitoring or guidelines (Pawluczuk, 2024).

Since the release of ChatGPT 3.5 in November 2022, the youth work field has increasingly begun to explore the potential of AI to enhance outreach, personalise support, and improve administrative efficiency. Yet, the adoption of AI in youth work remains in its early stages and involves a complex, multi-dimensional process—learning with AI, using AI to learn about learning, learning about AI, and preparing for AI (Holmes, Persson, Chounta, Wassonand, & Dimitrova, 2022). In addition, many youth professionals still lack the digital competences, confidence, and structural support necessary to use AI tools effectively (Cachia, Ferrari, Ala-mutka, & Punie, 2010). While AI integration presents clear benefits, insufficient understanding of its limitations and a lack of critical reflection on its outputs can introduce new challenges. As such, various stakeholders have called for greater attention to the responsible development and deployment of AI technologies (Stefan, 2024). This context raises pressing questions about how youth workers perceive AI, what support they require to integrate it into their practice, and what barriers they encounter in doing so.

Although digital transformation is explicitly recognised as a key priority in the European Youth Work Agenda, the current state of implementation—assessed through a survey conducted across all 27 EU Member States—has revealed several obstacles, including limited resources, insufficient political interest, a lack of recognition, and weak cross-sectoral cooperation (Hofmann-van de Poll, 2023). The findings underscore the urgency of promoting innovation and digitalisation in youth work, while also emphasising the need for capacity building and targeted training for both young people and professionals, to ensure that they are equipped with the skills and knowledge required to face emerging challenges (Fontana, Bisogni, & Tedesco, 2024).

In this context, understanding the needs, challenges, and perspectives of youth workers regarding AI integration is essential to fully capitalise on the potential of innovation and digitalisation within the sector. The present study addresses two key research questions:

RQ1: What challenges and opportunities do youth work professionals face when integrating AI into their practice?

RQ2: What competencies are essential for integrating AI into youth work?

This article is structured as follows. The next section outlines the research methodology, including the design of the focus groups and the data collection approach. This is followed by a presentation of the key findings, organised into thematic areas that reflect participants' experiences and insights, analysed using ATLAS.ti software. The subsequent section discusses these findings in relation to existing literature and practice. The article concludes by summarising the main conclusions, acknowledging the study's limitations, and offering recommendations for future research.

2. Research methodology

This research employed a mixed-methods approach, beginning with a literature review to gain an initial understanding of existing frameworks for AI in education. This was followed by a series of four focus groups conducted by a consortium of partners in Italy, Greece, Romania, and Portugal, aimed at exploring the needs, challenges, and perspectives of youth workers regarding the integration of AI into their professional practice. The final phase of the research was dedicated to the qualitative analysis of the collected data using thematic methods, supported by ATLAS.ti software.

2.1 Literature review

To establish a theoretical foundation for the study, the initial phase of the research involved a systematic review of existing competence frameworks and relevant scholarly and institutional literature. A structured search strategy was developed by refining the research questions (RQs) and identifying pertinent keywords and search strings. To enhance the comprehensiveness of the search, synonyms and alternative spellings were considered, ensuring the retrieval of a broad range of relevant sources.

The literature review focused on two primary themes: "AI competencies" and "Artificial Intelligence in youth work". To expand the scope, related terms were incorporated. For instance, searches for "AI competence frameworks" included terms such as digital competencies, AI skills, and AI competency models. In exploring the integration of AI into youth work, terms like AI in non-formal education, AI in education, and AI and youth were used. Boolean operators (AND/OR) were applied to effectively combine and connect search terms.

The search was conducted on multiple databases and platforms (Table 1), including the Google Scholar, United Nations Educational, Scientific and Cultural Organization (UNESCO) Digital Library, the Organisation for Economic Co-operation and Development (OECD) iLibrary, the Council of Europe's online resource databases, as well as the Erasmus+ Projects Results Platform to identify relevant research results of complementary European projects. These databases were chosen for their comprehensive selection of relevant and recent articles. The search targeted titles, abstracts, and keywords, focusing on articles published from 2015 onwards to capture the most current advancements in the field.

Table 1. Systematic refinement of the publications

Parameter	Content	Count
The initial search formula	TS = ("youth work" AND "artificial intelligence")	1650
Time frame selection	To focus on contemporary research, only publications from the last 10 years were retained.	1440
Document type selection	Only articles and review articles were included in the analysis.	64
Open Access	To ensure accessibility and transparency, open access publications were prioritised for detailed analysis.	38
Relevance Assessment	As a result of reviewing the abstracts, only the relevant for qualitative analysis have been selected.	24

Guided by PRISMA methodology (Page, et al., 2021), the authors selected 24 peer-reviewed articles which were systematically examined to extract insights on AI-related competencies and their relevance to youth work. It provided a conceptual foundation for understanding existing competence frameworks related to AI and its integration in educational contexts. The authors analysed the current literature and identified key trends, gaps, and areas of concern, which informed the development of the research questions and the formulation of the focus group guidelines.

2.2 Focus groups

The second phase of the research involved conducting focus groups with youth work professionals to gather qualitative data on their needs, challenges, and perspectives regarding AI integration into their practice. This method was chosen for its suitability in exploring individuals' opinions, attitudes, and experiences on a specific topic or area of interest in a permissive, non-threatening environment (Krueger & Casey, 2014).

The four focus groups were part of a broader study conducted by a consortium of four partner organisations from Italy, Greece, Romania, and Portugal, aimed at examining the factors influencing AI integration in youth work. To ensure consistency across implementation and reporting, a common guideline was developed and provided to all facilitators in advance. The guidelines outlined the participant selection criteria, facilitation instructions, discussion prompts, data collection methods, and reporting templates.

While the research began with a limited number of predefined themes, the guidelines also encouraged facilitators to consider multiple hypotheses regarding the competence needs required to harness the potential of AI in youth work. As a result, the instruments were revised to include semi-structured, open-ended questions, allowing participants to express their needs and challenges in their own terms, free from the constraints of rigid questioning.

With participants' consent, basic demographic information was collected. The focus groups posed open-ended questions to elicit participants' experiences, perceptions, opinions, emotions, and knowledge. Discussions were conducted in national languages and later translated into English. The data were transcribed in the national reports, enabling the authors of this article to analyse and code the material.

The strength of this focus group method lies in the richness of the qualitative process. Data were collected in dynamic settings that closely resembled educational environments, rather than through impersonal channels such as mail or telephone. Local contextual influences were not disregarded but were actively considered by the researchers to uncover latent or less obvious issues.

2.3 Qualitative analysis

The final phase of the research focused on data analysis, conducted using the qualitative software program ATLAS.ti. The two authors of this study independently coded each transcript and resolved any discrepancies through discussion and consensus. The analysis followed a process of data reduction and reconstruction to identify overarching themes. This involved a

careful reading of participants' responses to capture their essential meanings and assigning codes that accurately reflected their comments.

Data reduction—a key stage in qualitative analysis—refers to the process of selecting, focusing, simplifying, abstracting, and transforming the raw data derived from field notes or transcripts. The analysis proceeded by displaying information in matrices, reviewing the data for emerging patterns, and reconstructing the content into broad thematic categories, followed by visual mapping for interpretation (Miles & Huberman, 1994).

Thematic analysis was used to identify meaningful categories related to the research questions. As professional researchers note, the "keyness" of a theme does not depend on how often it appears but rather on its relevance to the overall research aim (Braun & Clarke, 2006). The analytical process was iterative, involving movement between inductive (data-driven) and deductive (theory-driven) reasoning. The network function in ATLAS.ti was utilised to visually represent the relationships between codes associated with work-related issues, supporting the development of themes during the analysis process (Friese, 2014).

This approach enabled the researchers to independently review and validate the themes across all focus groups, identify meaningful relationships, and interpret the data in a way that ensured the final themes genuinely reflected participants' experiences and perspectives.

3. Results

The results of the national focus groups and the qualitative analysis of the collected data are presented in the following section, structured to provide an overview of group composition as well as a thematic presentation of the needs, challenges, and perspectives of youth work professionals regarding AI integration.

3.1 Composition of the focus groups

The focus groups comprised 72 youth work professionals representing different types and levels of experience, fields of action, and target groups (Figure 1). The recruitment process was oriented towards achieving diverse participant groups in terms of age, educational, cultural, and socioeconomic backgrounds, gender identities, and orientations. The focus groups were conducted online, through video-conferencing platforms, and face-to-face between 20 April and 23 May 2024, and each session lasted approximately 90 minutes.
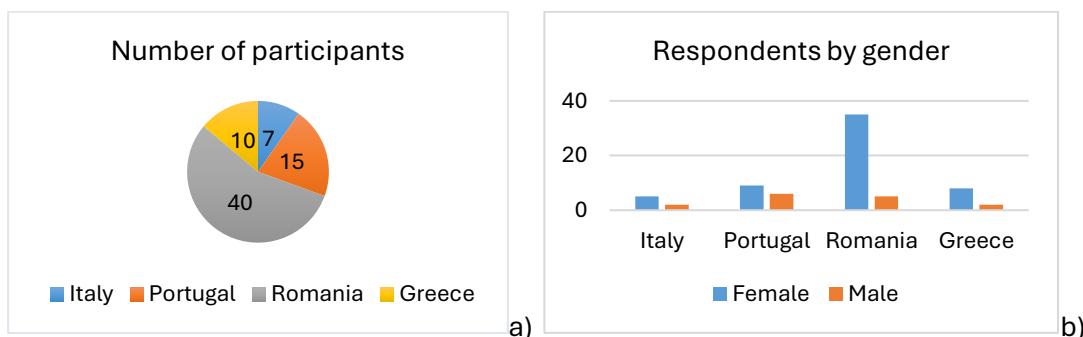

Figure 1. Respondents distribution (a) By country, (b) By gender

The age distribution of participants reflects the research team's efforts to collect relevant input from a diverse range of age groups. Specifically, the sample included 16 participants under 24 years old, 17 participants aged 25–34, 12 participants aged 35–44, 14 participants aged 45–54, and 3 participants over 55 years old. An additional group of 10 participants chose not to disclose their age. The national groups comprised both digitally engaged and AI-enthusiastic youth workers, as well as individuals with limited digital competencies who may feel alienated or excluded from discussions around AI integration.

3.2 Data collection

In accordance with the guidelines for focus group organisation, each session was facilitated by a moderator and supported by a note-taking researcher. The data collected during the discussions were compiled into four national reports, all written in English. Each report was structured into five sections, capturing participants' insights and reflections on the following topics: (1) Examples of relevant AI applications known or used in youth work; (2) Positive outcomes and benefits of using AI applications; (3) Challenges associated with the use of AI tools in youth work; (4) Essential skills required for youth workers to effectively use AI tools; and (5) Types of support that could facilitate the acquisition of AI-related competencies.

Following data collection, the national reports were subjected to in-depth analysis using ATLAS.ti software. In preparation for the thematic analysis, researchers engaged in multiple readings of the reports prior to initiating the coding process. This iterative reading allowed for the identification of subtle nuances not immediately apparent and supported the development and application of relevant codes (Table 2).

Table 2. List of quotations

Codes	Quotations	%
AI Applications in youth work		
Process improvement	44	14.01
Contexts of use (education, communication)	40	12.74
Benefits and positive outcomes		
Time-saving / Efficiency	41	13.06
Increased engagement of young people	15	4.79
Challenges in using AI		
Lack of digital competence	17	5.41
Ethical concerns (bias, data privacy)	20	6.37
Difficulty interpreting AI-generated content	12	3.82
Lack of guidance	13	4.14
Essential competencies		
Ethical awareness	5	1.60
Data interpretation skills	23	7.32
Responsible use of technology	32	10.19
Support and training needs		
Formal training programmes	24	7.64
Access to learning resources	12	3.82

Peer support / mentoring		16	5.09
Total: 14		**Total: 314**	**100**

Codes were assigned to segments of data that were deemed relevant to the research questions. At the beginning of the coding process, several potential themes were identified, with some later merged during a consensus-building process between the authors. Coding was carried out using ATLAS.ti, an online qualitative analysis tool designed for managing large sets of textual data.

It is important to note that, although AI tools integrated into the software can suggest possible codes, the responsibility for identifying and selecting the final codes rested entirely with the researchers. The qualitative software served primarily as a tool to support and streamline the organisation and analysis of complex data, while human judgement remained central to the interpretive process.

3.3 Thematic analysis

The next phase was dedicated to identification and development of emerging themes. This required the researchers to review all the codes and determine how different codes could be combined to form overarching themes and subthemes. During this stage of analysis, the authors utilised co-occurrence and cross-classification matrices to further explore relationships within the data. Cross-classification matrices were created by intersecting one dimension of data with another, allowing researchers to move iteratively between the matrix and the original data to populate and refine the analysis. These tools proved valuable in revealing meaningful patterns and relationships, supporting a deeper understanding of the participants' perspectives.

Theme 1. Experiences with AI in youth work practice

This theme captures the current use of AI tools, the contexts in which they are applied, and the perceived benefits for youth work. A prominent pattern emerging across the four national focus groups is the use of AI for process improvement, particularly in automating routine and time-consuming tasks. Youth workers reported that tools such as ChatGPT, Quillbot, Microsoft Translator, and Canva AI have streamlined activities like email drafting, report writing, scheduling, and data analysis. Participants highlighted the integration of AI in both educational and communication settings. In formal and non-formal education, AI tools support content creation, curriculum adaptation, and personalised learning, catering to diverse learning styles and levels. In communication, platforms such as Synthesia and Mentimeter enhance interaction through visual storytelling and real-time engagement. AI was also noted for promoting inclusivity, enabling youth from different linguistic and cultural backgrounds to access and contribute to digital spaces.

Theme 2. Benefits and positive outcomes of AI integration

This theme focuses benefits and support mechanisms that can facilitate or hinder integration as resulted from inductive interpretation of national reports. One of the most frequently cited benefits of AI integration in youth work was its potential to significantly enhance time-efficiency and workflow optimisation. Participants described how AI tools such as ChatGPT, Microsoft Translator, Canva AI, and project management platforms (e.g. Notion, ClickUp) helped streamline

repetitive administrative tasks—such as writing emails, organising schedules, and generating reports—thus freeing up valuable time for more meaningful interaction with young people. Additionally, AI-supported content creation tools enabled youth workers to produce educational materials, social media content, and multimedia resources faster and with greater creativity. This efficiency directly contributed to increased engagement among young people, as the use of personalised, interactive, and visually engaging content (e.g. storybooks, quizzes, avatars, and video presentations), captured their attention and encouraged active participation.

Theme 3. Barriers and challenges for AI integration

This theme focuses on challenges youth workers face in adopting AI as resulted from focus group discussions. A major barrier identified across the focus groups was the lack of digital competence among youth workers, which hinders their ability to use AI tools effectively in professional practice. Many participants highlighted the need for foundational ICT skills and continuous training to keep pace with rapidly evolving technologies. In addition to technical limitations, ethical concerns were repeatedly raised, particularly around data privacy, plagiarism, and the risk of bias in AI-generated content. These concerns were closely tied to the difficulty some youth workers face in interpreting AI outputs critically, especially when tools present outdated, incomplete, or misleading information. The absence of clear and accessible guidance or training frameworks further exacerbates these issues, leaving many practitioners uncertain about how to evaluate AI-generated data or integrate these tools responsibly and effectively into youth work. This highlights an urgent need for structured support, including ethical guidelines, training resources, and contextualised digital literacy education tailored to the realities of youth professionals.

Theme 4. Competence needs for effective AI use

This theme addresses the skills and knowledge youth workers require to work meaningfully with AI and the kind of support needed to develop these competencies. A recurring theme across all focus groups was the necessity of fostering ethical awareness and a strong sense of responsible technology use among youth workers. Participants stressed the importance of understanding issues related to data privacy, copyright, plagiarism, and the ethical boundaries of AI-generated content. There was a shared concern that without clear ethical guidelines, AI could inadvertently compromise values such as integrity, intellectual honesty, and inclusivity. Youth workers must be equipped to critically evaluate AI outputs, especially when interpreting data, ensuring alignment with ethical standards such as GDPR compliance and cultural sensitivity. This calls for strong data interpretation skills, enabling youth workers to discern meaningful insights while being mindful of potential inaccuracies or biases embedded in the AI systems.

Theme 5. Support and training needs

To effectively support youth workers in integrating AI into their practice, participants emphasised the need for formal training programmes, including structured courses, workshops, and hands-on learning opportunities that address both technical and ethical dimensions of AI. Such programmes should be tailored to the youth work context and grounded in established frameworks like DigComp and LifeComp. In addition to formal education, youth workers called for improved access to diverse learning resources, such as curated lists of online tutorials, MOOCs,

and step-by-step guides. These resources would allow them to deepen their understanding at their own pace. Furthermore, the importance of peer support and mentoring was highlighted as a key enabler of competence development. Networking opportunities, knowledge exchange events, and mentoring from more experienced colleagues or AI practitioners can provide practical insights, boost confidence, and foster a collaborative culture of continuous learning and innovation in youth work.

A thematic map was developed to provide a visual representation of the overall data patterns and the relationships among the identified themes (Figure 2). The central phenomenon is positioned at the core of the map, with themes arranged around it to illustrate their interconnections. This mapping process helped clarify the structure of the findings and offered a coherent framework for interpreting the relationships between different aspects of the data.
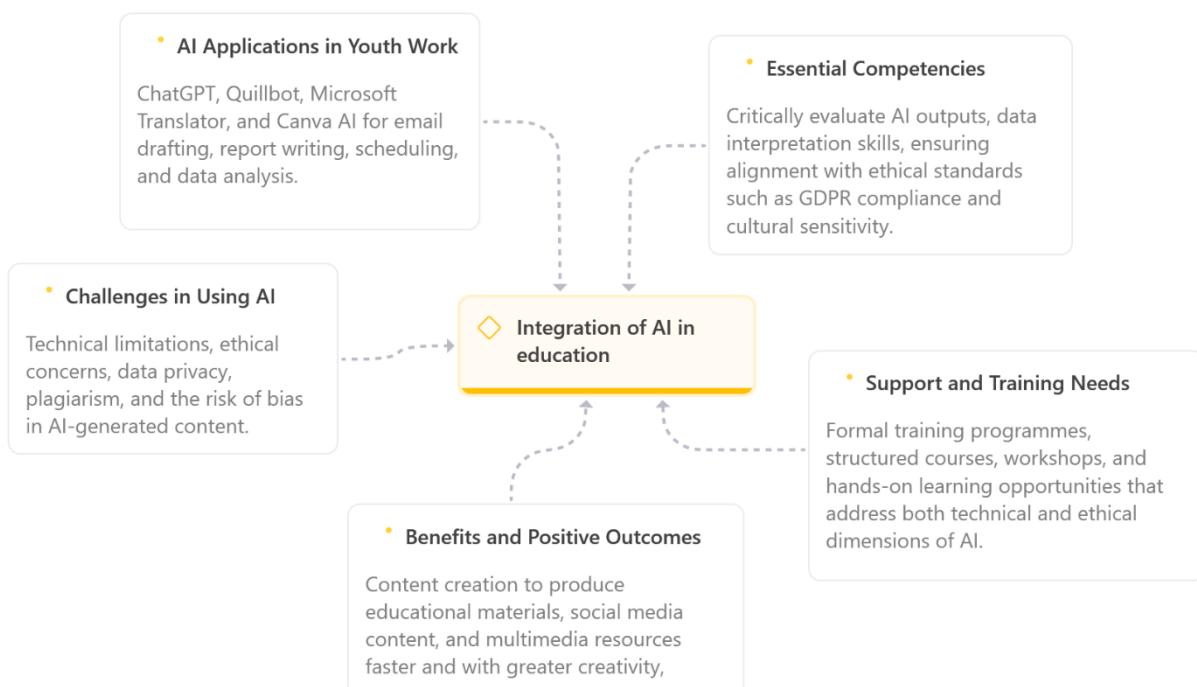

Figure 2. Thematic map

The authors of this study explored both common themes and cross-country differences to generate insights that can inform future policy development, training initiatives, and professional practice. Through this approach, the findings contribute to the ongoing discourse on how AI can be meaningfully integrated into youth work, with the aim of supporting both practitioners and the young people they engage with.

4. Discussion

This study set out to investigate the experiences, barriers, and competence needs related to the use of Artificial Intelligence (AI) in youth work, as perceived by practitioners across four European countries. The thematic analysis provided a multi-layered understanding of how AI is currently

integrated into youth work, the challenges faced by youth professionals, and the skills and support systems needed to advance digital transformation in the sector. The findings align with and expand upon existing literature on digital youth work and AI in education, notably by offering a bottom-up, practitioner-focused perspective. This discussion synthesises the experiences with AI, barriers and enablers, and competence needs, within the broader context of digital innovation in youth work.

AI tools are increasingly shaping the landscape of youth work, primarily through process improvement and enhanced personalisation. Participants widely reported that AI applications such as ChatGPT, Canva AI, Microsoft Translator, and Quillbot help streamline time-consuming administrative tasks like email drafting, scheduling, and reporting. These efficiencies align with research suggesting that digital tools can reduce managerial burdens and allow professionals to concentrate on interpersonal and strategic elements of their work. The use of AI in communication and educational contexts exemplifies its adaptability. From real-time translation with Microsoft Translator to interactive visual content created through Synthesia and Mentimeter, AI enables youth workers to reach broader and more diverse audiences. However, while the enthusiasm for experimentation was notable, it varied according to participants' prior experience, revealing disparities in digital fluency that carry implications for equitable adoption.

Despite the enthusiasm for AI, several barriers limit its full integration into youth work. The most frequently cited challenge was the lack of digital competence, confirming earlier findings that digital literacy remains unevenly distributed across the social care and educational professions. Participants often felt unprepared to evaluate the quality, relevance, or ethical implications of AI outputs, particularly when those outputs appeared authoritative but lacked contextual accuracy.

Conversely, enablers included the availability of free or low-cost tools and the perceived benefits of efficiency and engagement. Youth workers cited the potential for time-saving through AI-supported automation as a key motivator, alongside enhanced engagement among young people when using interactive and personalised tools. Nevertheless, participants warned against overreliance on AI, cautioning that this could reduce critical thinking and creativity among both youth workers and young people. Therefore, meaningful AI integration requires a balance between innovation and human-centred pedagogy.

The integration of AI into youth work calls for a holistic competence framework encompassing technical, analytical, and ethical dimensions. Participants stressed the importance of ethical awareness, especially in relation to data privacy, copyright, and intellectual honesty. The ability to critically interpret AI-generated data was also seen as essential to avoid misapplication or overreliance.

Participants highlighted formal training programmes, such as those based on the DigComp and LifeComp frameworks, as crucial for developing foundational and advanced competencies. Peer support, mentoring, and access to curated learning resources were also seen as essential for fostering a culture of continuous learning. The call for collaborative learning environments, hackathons, and knowledge exchange events suggests a shift from isolated digital training towards community-driven upskilling strategies.

5. Conclusions

In the context of increasing digitalisation and innovation across the youth work sector, understanding the needs, challenges, and perspectives of youth workers regarding the integration of Artificial Intelligence (AI) has become crucial. This study addressed two central research questions: RQ1: What challenges and opportunities do youth work professionals face when integrating AI into their practice? and RQ2: What competencies are essential for integrating AI into youth work?

To answer these questions, the study employed a rigorous qualitative methodology that included four national focus groups conducted across Europe, guided by a thematic analysis supported by ATLAS.ti software. The data revealed a nuanced landscape where AI is gradually being integrated into youth work practices, primarily to streamline administrative processes, enhance communication, and personalise educational experiences. Tools such as ChatGPT, Canva AI, Microsoft Translator, and Synthesia were cited for their ability to improve workflow efficiency, engagement, and inclusivity. However, alongside these opportunities, youth workers identified several pressing challenges, including a lack of digital competence, limited access to training, and concerns about data privacy and ethical use.

The second research question was addressed through an in-depth analysis of the competencies youth workers perceive as essential for AI integration. Participants strongly emphasised the need for a balanced skill set that includes technical know-how, ethical awareness, data interpretation skills, and prompt engineering capabilities. The study highlights the value of structured training and underlines the importance of continuous professional development through peer learning, mentoring, and access to curated educational resources. This competence-based approach supports a sustainable and human-centred integration of AI technologies into youth work.

While the study offers important insights, it is not without limitations. The scope was limited to a qualitative exploration within four countries, which may not reflect the full diversity of experiences across Europe. Additionally, the findings rely on self-reported perceptions, which may be influenced by varying levels of familiarity with AI tools. Future research should adopt a longitudinal and cross-sectoral approach to assess the evolving role of AI in youth work and test the effectiveness of tailored training programmes. Further investigation is also needed into policy-level support mechanisms that can enhance AI literacy and ethical integration across the sector.

Overall, this study demonstrates that AI has the potential to significantly enrich youth work, provided that its implementation is guided by reflective practice, ethical responsibility, and robust competence development. The voices of practitioners presented here offer a strong foundation for shaping future strategies, policies, and educational programmes that can empower youth workers to harness AI responsibly and creatively in support of young people's growth and inclusion.

6. Acknowledgement for funding

7. References

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. Retrieved from http://eprints.uwe.ac.uk/11735

Cachia, R., Ferrari, A., Ala-mutka, K., & Punie, Y. (2010). *Creative Learning and Innovative Teaching: final report on the Study on Creativity and Innovation in Education in EU Member States.* Luxemburg/Seville.

COE. (2020). *Youth work essentials*. Retrieved from Council of Europe Portal: https://www.coe.int/en/web/youth-portfolio/youth-work-essentials

Fontana, S., Bisogni, F., & Tedesco, S. (2024). *Implementing the European youth work agenda and the Bonn Process at the local and regional level in the EU.* Commission for Social Policy, Education, Employment, Research and Culture. Retrieved from https://op.europa.eu/en/publication-detail/-/publication/363276c6-1bd7-11ef-a251-01aa75ed71a1/language-en

Friese, S. (2014). *Qualitative Data Analysis with ATLAS.ti.* SAGE Publications. DOI: https://doi.org/10.4135/9781529799590

Hofmann-van de Poll, F. (2023). *The state of play of national processes within the Bonn processs.* Bonn, Germany: JUGEND für Europa. Retrieved from https://www.bonn-process.net/downloads/publications/52/Bonn_Process_2023_State_of_Play_Survey_Report.pdf

Holmes, W., Persson, J., Chounta, I., Wassonand, B., & Dimitrova, V. (2022). *AI and Education. A critical view through the lens of human rights, democracy and the rule of law.* Council of Europe. Retrieved from https://rm.coe.int/prems-092922-gbr-2517-ai-and-education-txt-16x24-web/1680a956e3

Krueger, R., & Casey, M. (2014). *Focus groups: A practical guide for applied research* (5 ed.). SAGE Publications.

Miles, M., & Huberman, A. (1994). *A. Qualitative data analysis: An expanded sourcebook* (Second ed.). Sage Publications. Retrieved from https://vivauniversity.wordpress.com/wp-content/uploads/2013/11/milesandhuberman1994.pdf

Miles, M., & Huberman, M. (1994). *Qualitative Data Analysis.* SAGE Publications, Inc. Retrieved from https://vivauniversity.wordpress.com/wp-content/uploads/2013/11/milesandhuberman1994.pdf

NYCY. (2020). *What is youth work?* Retrieved from National Youth Council of Ireland: https://www.youth.ie/articles/what-is-youth-work/

Page, M., Moher, D., Bossuyt, P., Boutron, I., Hoffmann, T., Mulrow, C., & al., e. (2021). PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ.* doi:10.1136/bmj.n160

Pawluczuk, A. (2024). *Automating Youth Work: youth workers views on AI*. Council of Europe. Retrieved from https://pjp-eu.coe.int/documents/42128013/116591216/AI_views+of+youth+workers.pdf/93ac326a-cf80-3fa4-c4e5-56ee4038a766?t=1682336763487

Saldana, J. (2009). *The Coding Manual for Qualitative Researchers*. Los Angeles: Sage Publications.

Stefan, V. (2024). *Insights into artificial intelligence and its impact on the youth sector*. Council of Europe. Retrieved from https://pjp-eu.coe.int/documents/42128013/105305579/051024_Insights%20into%20AI%20and%20the%20youth%20sector.pdf/2a717a7f-8e51-6fad-c129-5a4521d6c8b6?t=1720513638458

Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry, 6*(3), 205-228.

Non-formal education and its impact on society. Case study on the simulation of a judicial trial in the 7th grade

Cristina Iordache[1,2*]

[1]Secondary School No. 29 "Mihai Viteazul" Constanta, Romania
[2]Secondary School No. 28 "Dan Barbilian" Constanta, Romania
*Corresponding author: gikhristin@gmail.com

Abstract. The article explores the role of non-formal education in the development of students' civic and social skills, by presenting a case study conducted in the 7th grade. The aim of the research was to demonstrate how interactive methods can support active learning and contribute to the formation of a responsible attitude towards the law and society.

The activity involved organizing a mock trial in the school environment, in which students played different roles in a fictional case. The simulation was complemented by the participation of a professional lawyer, within the project "Be a lawyer in your school!", who held applied lessons to deepen legal concepts. The approach was non-formal, focused on learning through direct experience.

Participation in the activity generated increased interest in the topic of justice and contributed to the development of communication, argumentation and collaboration skills. Students became more aware of the importance of respecting the law and demonstrated a better understanding of civic responsibilities. The activity strengthened self-confidence and stimulated active involvement in the educational process.

Mock trials and collaboration with professionals outside of school can have a significant impact on training young people as active citizens. Non-formal education enriches formal learning by providing relevant and authentic contexts that prepare students for life in society. Such practices should be encouraged and systematically integrated into the educational process.

Keywords: Non-formal education; Mock trials; Civic competences; Active citizenship; Experiential learning.

1. Introduction

In a constantly changing educational context, which places increasing emphasis on the formation of transversal skills and the development of critical thinking, non-formal education has become an indispensable pillar in the training process of young people. It is not limited to the transmission of information, but aims to create authentic, relevant learning contexts adapted to the individual rhythm of students (Niculescu, 2009).

Non-formal education has a voluntary, flexible and complementary character to the formal system, offering students opportunities for active learning and social involvement. Through methods such as learning through play, thematic projects, debates or simulations, students can

experience real-life situations, which develop their autonomy, empathy and civic spirit (Petrescu, 2016).

In this article, I present a non-formal activity carried out with a 7th grade class, in which students participated in a simulated judicial trial. This approach aimed to develop social and civic skills, but also to familiarize with the values of the rule of law and justice.

2. Theoretical framework

Education for democratic citizenship involves not only teaching theoretical notions about state institutions, but also encouraging active participation, understanding of rights and obligations, and personal responsibility in society.

The Council of Europe has been promoting student-centred and experiential pedagogical approaches for years as the most effective in shaping democratic attitudes (Council of Europe, 2018).

Legal simulations, very popular in civic education in the United States (in the form of mock trials), have been successfully adopted in European schools. They offer students a clearly structured framework, but also the freedom to explore roles, support arguments, and understand the moral and legal implications of certain behaviours (Bîrzea, 2012).

These activities contribute to legal literacy, an essential element for the formation of active and aware citizens.

3. Methodology and activity development

In order to consolidate theoretical knowledge about the rule of law and the justice system, but also to stimulate critical thinking, I organized a simulation of a judicial trial with 7th grade students in April. The chosen case was a fictitious one, but inspired by real situations encountered in the school environment: the theft of a valuable object (a golden pen) and the manifestation of aggressive behaviours between classmates.

The students were assigned to teams and were given specific roles – judge, prosecutor, defence and prosecution lawyers, defendant, victim, witnesses, clerk. The preparation of the activity lasted for two weeks, during which the students drafted pleadings, studied codes of conduct and relevant articles from the Constitution and the Criminal Code, adapted to their level of understanding.

To provide authenticity, I made robes for the judge and lawyers and purchased a symbolic gavel. The classroom was redecorated to resemble a courtroom, and the activity was filmed with the parents' consent to allow for later analysis.

The simulation was followed by a reflective debate, in which students were encouraged to express their opinions on the roles played, the fairness of the decision made, and how violence in school can be prevented.

In addition, I integrated the activity into the national educational project "Be a lawyer in your school!", carried out in partnership with the Constanta Bar Association. A volunteer lady lawyer

held four interactive lessons, during which she explained the concepts of justice, the rights and responsibilities of minors, the role of the defence, and the legal consequences of criminal acts. Her presence added credibility and gave students the opportunity to ask direct questions to a legal professional.

4. Results and impact

The activity generated increased interest in the topic of justice and significantly contributed to the development of communication skills, active listening and logical argumentation. Students demonstrated empathy for victims, but also understanding of the complexity of the role of a judge or lawyer. Participants reported that they overcame their emotions in front of the public and learned to collaborate in a more structured way.

Based on a questionnaire administered after the activity, over 85% of students stated that they better understood how the justice system works and that they were more attentive to behaviours that may have legal consequences. Also, 70% of students mentioned that the activity helped them to reflect more deeply on the notion of personal responsibility.

Fellow teachers and parents noted a positive impact on students' self-confidence and a visible improvement in their ability to express structured opinions in other classes.

5. Conclusions

Non-formal education proves to be not only a complement to formal education, but a vital space for the development of essential skills in contemporary society. Simulation-type activities, especially legal ones, can become true transformative learning experiences, especially when supported by specialists and integrated into a coherent pedagogical framework.

The approach presented confirms that middle school students can understand complex concepts, if they are presented in an accessible, contextualized and active way. Collaboration with professionals outside the school, such as lawyers, adds value to the educational process and facilitates the building of bridges between school and real life.

In conclusion, non-formal education offers authentic opportunities for civic training, directly contributing to the creation of a generation of aware, involved and responsible citizens.

6. References

Niculescu, M. (2009). *Non-formal education in youth development*. Polirom Publishing House.

Petrescu, D. (2016). *Alternative forms of education*. Didactic and Pedagogical Publishing House.

Popescu, A. (2018). *Interactive teaching methods in social education*. Tritonic Publishing House.

Bîrzea, C. (2012). *Education for democratic citizenship*. Council of Europe.

Council of Europe. (2018). *Competences for democratic culture: Living together as equals in culturally diverse democratic societies*. Strasbourg.

Innovative teaching and learning methods in Romanian language and literature classes at the gymnasium

Georgiana Elisabeta Baciu[1]*

[1]School „Constantin Brâncoveanu", Râmnicu Sărat, Buzău, Romania
*Corresponding author: Panait_elisabeta_2010@yahoo.com

Abstract. Teaching Romanian language and literature in middle school requires an adaptation to the demands of the digital generation, going beyond traditional methods. Today's students are oriented towards technology, critical thinking and interactivity. Teachers resort to innovative methods to make the lesson more relevant and engaging. Among the most effective are: Project-based learning: This stimulates creativity and teamwork. Students can create posters, brochures or digital presentations about authors or literary texts, developing skills in analysis, synthesis and expression. Digital technology: The role of technology is crucial. Educational applications, interactive quizzes, online learning platforms (such as Digitaliada) and the creation of films or podcasts on literary themes offer a modern approach, adapted to the way students think. The Digitaliada platform is an essential tool in the digitalization of education in Romania. It offers modern and accessible educational resources, with a formative, innovative and integrative role. It contributes to increasing the quality of education through interactive digital methods, offering free lessons and materials, adapted to the national curriculum, stimulating student interest and improving school results through attractive approaches.

Keywords: Digital presentations; Romanian language and literature; Digitaliada platform; Digital methods.

1. Introduction

The main significance is that the objectives will aim to align the teaching process with the realities of today's students. They are digital natives, accustomed to technology and interactivity, and traditional methods are no longer enough to capture their attention and maintain their motivation.

The research aims to identify ways in which the Romanian language and literature become relevant and attractive for them. Many students perceive the study of Romanian language and literature as arid or too theoretical. The research objectives will focus on finding practical solutions that will transform this perception, making the subject more accessible and enjoyable, and thus contributing to reducing the rate of absenteeism and school dropout caused by lack of interest.

A key objective will be to assess how innovative methods can lead to better understanding and assimilation of knowledge, and thus to higher academic outcomes. This includes not only better grades, but also a deeper understanding of literary texts and a better mastery of linguistic norms. For example, using manga as a creative tool has been shown to improve both student performance and creativity in literary comprehension (Veeramuthu & Ganapathy, 2022).

The objectives will focus on how new methods contribute to the development of critical thinking, creativity, communication and collaboration skills – essential skills in a constantly changing society. Innovative teaching fosters the 4Cs and helps students navigate complex learning environments (Mwamakula, 2024). Various methods like problem-based learning using poetry, songs, and role-plays increase motivation, empathy, and critical thinking. For example, through interactive projects or the use of digital platforms, students learn to work in teams and express their ideas in a structured way.

The research objectives will highlight the need for continuous training and professional development of teachers. The identification and validation of innovative methods provides them with concrete tools and support to diversify their teaching strategies.

2. Educational methods for digital generation

In an educational context in constant transformation, teaching Romanian language and literature in middle school can no longer remain anchored only in traditional methods. Today's students are the digital generation, familiar with technology, critical thinking and the need for interactivity. To meet these needs, Romanian teachers increasingly resort to innovative teaching methods, which transform the lesson into a relevant and captivating experience. Among the most effective methods are: learning through projects, which stimulate creativity and teamwork. For example, students can create posters, brochures or digital presentations about a studied author or about a literary text, thus developing skills in analysis, synthesis and coherent expression.

Digital technology also plays an important role. Educational applications, interactive quizzes, online learning platforms (Figure 1), making short films or podcasts on literary themes offer a different approach, closer to the way students think and work.

Figure 1. Digitaliada online learning platform, Source: https://www.platformadigitaliada.ro

The Digitaliada platform represents an important pillar in the process of digitizing education in Romania, offering modern and accessible educational resources to both teachers and students. It has a formative, innovative and integrative role, contributing to increasing the quality of the educational act through interactive digital methods. It also offers free, easy-to-use digital lessons and materials, adapted to the national curriculum, stimulates students' interest by using technology in the learning process, improves school results, through modern and attractive methods. By integrating technology into the learning process (e.g. educational applications, interactive quizzes, making films or podcasts), the platform makes the classroom more captivating and relevant for students.

Game-based learning (gamification) is another effective method: through playful scenarios, competitions or literary escape rooms, students are challenged to discover and understand texts, while developing intrinsic motivation. Another important element is creative writing, which offers students the opportunity to express themselves freely, to rewrite texts from different perspectives, to compose replicas or continuations of well-known works. Through game elements, students become more interested and involved in learning activities. The desire to earn points, advance to a higher level or obtain rewards stimulates them to actively participate and make an effort. Gamification contributes to the development of critical thinking, problem solving and creativity. For example, in role-playing games or group projects, students are put in situations that require them to analyse texts, formulate arguments or create original content. Unlike traditional tests, game-based activities can be perceived as less stressful, creating a more relaxed and enjoyable learning environment. Mistakes become learning opportunities, not failures.

3. Characteristics of dynamic learning environment

The main goal of gamification is to transform learning Romanian language and literature from an activity sometimes perceived as rigid or difficult, into an experience:

1) Captivating and motivating: To stimulate students' intrinsic desire to learn, making the subject more attractive.

2) Interactive and participatory: To encourage the active involvement of all students, including the most timid, in a safe and non-judgmental environment.

3) Relevant and applicable: To demonstrate the relevance of language and literature concepts in various contexts, connecting them to students' experiences.

4) Efficient in the acquisition of skills: To facilitate the acquisition and consolidation of knowledge and skills (e.g. vocabulary, grammar, oral and written expression, literary analysis) in a natural and sustainable way.

5) Developing the pleasure of reading and writing: To cultivate a positive attitude towards reading and writing, transforming these activities into sources of pleasure and exploration.

By integrating playful elements, Romanian language teachers can create a dynamic learning environment that not only transmits knowledge, but also develops essential skills for the 21st century and, most importantly, instils in children a love for the Romanian language and literature.

An increasingly frequently used platform in the teaching process is Canva, an intuitive graphic design tool that offers attractive visual resources, easy to use by both teachers and students. In Romanian language and literature classes, Canva brings added dynamism, creativity and interactivity, transforming learning into a modern and efficient approach. Through Canva, teachers can create posters with essential information about authors, literary movements or grammatical notions, visual schemes, educational comics or interactive presentations. Students can more easily and logically understand the structure of a text, the elements of composition or the artistic message. Using Canva contributes to the formation of transversal skills: critical thinking, visual literacy, collaborative spirit (through team projects), as well as responsibility in writing a coherent and aesthetic visual product. In the context of modern education, Canva is a reliable ally in transforming Romanian language lessons into memorable visual experiences. Students not only learn, but also create, and this gives them confidence and motivation.

Thus, the Romanian language and literature becomes not just an object of study, but an opportunity to discover oneself, the world, and the beauty of the word, and students learn with joy, because they feel involved and valued.

4. Conclusions

In conclusion, the digitalization of education, excellently exemplified by the resources offered by the Digitaliada Platform, along with the integration of modern methods such as gamification and the use of intuitive visual tools such as Canva, fundamentally transforms the teaching and learning of the Romanian language and literature. These innovative approaches create a captivating and relevant teaching environment, stimulate students' intrinsic interest, develop their critical thinking, creativity and collaboration skills. By combining technology with student-centred pedagogical strategies, the educational process becomes not only more efficient in achieving academic objectives, but also an enjoyable learning experience, which prepares students for the challenges of a constantly changing world.

5. References

Veeramuthu, S. P., & Ganapathy, M. (2022). An innovative teaching tool: Manga for KOMSAS' prose comprehension. *International Journal of English Language and Literature Studies*. 11(1), pp 1-15, DOI: https://doi.org/10.18488/5019.v11i1.4390.

Mwamakula, F. (2024). Developing student teachers' innovative minds as a tool for enhancing the art of teaching. *International Journal of Education Foundations*. 1(1), pp 7-18, DOI: https://doi.org/10.33687/ijef.001.01.0002.

Staiculescu, C., Tanase, C., Paduraru, ME., Enachescu, V.A. (2025). *Laboratorul mintilor creative*. *Proiectarea didactica din perspectiva competentelor cheie.* Editura Universitară.

Cucoș, C. (2024). *Educația. preocupări, viziuni, previziuni*. Editura Polirom.

Digitaliada (2025). *Online learning*. https://www.platformadigitaliada.ro

Digital-augmented transdisciplinary learning: The convergence that redefines education

Liliana Pascu[1]*

[1]Secondary School No. 29 "Mihai Viteazul" Constanta, Romania
*Corresponding author: pascu.lilia@yahoo.de, pascu.lilia@gmail.com

Abstract. In the context of rapidly evolving educational paradigms, this study explores how the convergence of transdisciplinary approaches and digital technologies reshapes modern learning environments. The research aims to investigate how digital tools enhance transdisciplinary learning by promoting holistic problem-solving, collaboration across domains, and learner-centred education. The objective is to assess whether digital augmentation strengthens connections between knowledge areas while adapting to learners' needs in a dynamic, technology-driven society.

This research employs a mixed-methods approach, integrating qualitative analysis of classroom practices with quantitative assessment of student engagement and performance. Case studies from secondary and higher education institutions were conducted, where educators implemented project-based learning infused with digital platforms such as Prezi, Kahoot!, and Nearpod. Surveys and interviews with teachers and students provided insight into how technology facilitated transdisciplinary learning processes, while comparative analysis was used to evaluate outcomes across disciplines.

Initial findings suggest that digital tools significantly contribute to breaking traditional subject silos, enabling learners to approach real-world problems through interconnected perspectives. Students exhibited greater motivation and autonomy when engaged with digital-enhanced, transdisciplinary projects. Educators reported improved differentiation, more inclusive practices, and deeper conceptual understanding among students. Furthermore, technology emerged as a catalyst for creativity, allowing learners to construct knowledge in personalized and collaborative ways.

This research underscores the transformative potential of digital-augmented transdisciplinary learning in cultivating adaptable, critical-thinking individuals prepared for interdisciplinary challenges. The integration of technology with cross-disciplinary pedagogy not only modernizes instruction but also enhances educational equity and accessibility. These findings advocate for a strategic redesign of curricula to embrace digital innovation as a core component of future-ready, transdisciplinary education.

Keywords: Digital education; Transdisciplinary learning; Augmented reality (AR); Educational innovation; Learner engagement

1. Introduction

Technology in Education means Innovation, Sustainability and Social Impact. In the 21st century, education faces complex challenges that require rapid adaptation, the integration of emerging technologies, and the promotion of sustainability (Mayer, 2005). This article analyses how technology transforms the educational process, investigates innovative methods of teaching and learning, explores the concepts of educational and social sustainability, and highlights the role of non-formal education in societal development.

The Use of Technology in Education is very important. Digital technology has revolutionized the educational process by facilitating access to information, personalizing learning, and creating interactive educational environments. E-learning platforms, educational applications, augmented reality (AR), and artificial intelligence (AI) offer flexible learning opportunities tailored to students' individual needs. Relevant examples:

- LMS (Learning Management Systems) like Moodle or Google Classroom efficiently manage teaching activities.

- Interactive simulations and virtual reality (VR) support experiential learning in fields such as medicine, physics, or history.

- Artificial intelligence is used to analyse student progress and provide personalized feedback.

- Trans disciplinarity goes beyond integrating knowledge across disciplines—it seeks holistic solutions by combining academic insights with real-world problems, often involving multiple stakeholders. Here's how this educational theme connects:

- Blended Disciplines: Technology tools like AI or AR are not limited to computer science; they reshape humanities, arts, and sciences alike. For instance, VR enables immersive historical reenactments, merging tech with storytelling and ethics.

- Flexible Learning Paths: Personalized education enabled by AI aligns with transdisciplinary values, empowering learners to explore intersections between fields rather than staying in academic silos (De Chardin, 1959).

- Societal Impact: By including sustainability and non-formal education, the article emphasizes a human-centred approach—a core principle of transdisciplinarity that values not only technical solutions, but also ethical, cultural, and social dimensions.

- Collaborative Innovation: Platforms like Google Classroom create space for collaborative work, involving educators, learners, and sometimes even communities—mirroring the inclusive stakeholder engagement found in transdisciplinary research and action.

2. Research methodology

This study employs a design-based research (DBR) approach to explore the convergence of digital augmentation and transdisciplinary learning in educational contexts. The methodology integrates qualitative and quantitative techniques to ensure a holistic understanding of the phenomena.

Transdisciplinary digital education blends diverse methodologies from pedagogy, technology, and social sciences. Key approaches include:

- Design-Based Research (DBR): Iterative cycles of designing, testing, and refining educational interventions in real-world settings.

- Participatory Action Research (PAR): Engages educators, learners, and community stakeholders in co-creating knowledge and solutions.

- Mixed Methods: Combines qualitative (interviews, focus groups) and quantitative (surveys, analytics) techniques to capture complex learning dynamics.

- Real-Life Labs & Citizen Science: Learners collaborate with external experts to solve authentic problems, bridging academic and societal knowledge.

- Design-Based Research (DBR): Iterative cycles of design, implementation, analysis, and refinement of learning environments.

- Case Study Analysis: Real-world educational settings were examined to understand how digital tools support transdisciplinary learning.

- Mixed Methods: Combines surveys, interviews, and performance analytics to triangulate findings.

Digital tools empower transdisciplinary learning by enabling collaboration, personalization, and immersion across disciplines:

Table 1. Digital tools mapped to transdisciplinary learning contexts.

Tool/Platform	Purpose	Transdisciplinary Application
Moodle / Google Classroom	Learning management & collaboration	Facilitates cross-disciplinary project work
CoSpaces Edu / Merge Cube	AR/VR for immersive learning	Merges STEM, arts, and ethics in simulations
Padlet / Miro	Visual brainstorming & mapping	Supports idea synthesis across disciplines
AI Feedback Systems	Adaptive learning & analytics	Personalizes learning paths across domains
Google Arts & Culture	Cultural exploration	Integrates history, ethics, and digital media

Table 2. Digital tools mapped to transdisciplinary integration and functionality.

Tool	Discipline Integration	Functionality
CoSpaces Edu	STEM + Arts	3D modelling, storytelling
Merge Cube	Biology + Design	Tactile AR interaction

Google Arts & Culture	History + Ethics	Virtual museum tours, cultural analysis

- Learning Management Systems (LMS) such as Moodle and Microsoft Teams for collaborative learning.

- Data Analytics Software such as SPSS and NVivo for statistical and thematic analysis.

- AI-Powered Feedback Systems, such as adaptive learning platforms that personalize content based on learner behaviour.

2.1 Data

Data collection in transdisciplinary digital education is multifaceted, reflecting its complexity:

- Learning Analytics: Tracks engagement, progress, and collaboration patterns across platforms.

- Digital Artifacts: Includes student-created content (videos, models, essays) that reflect cross-domain thinking.

- Surveys & Interviews: Capture perceptions of learners and educators on interdisciplinary integration.

- Interaction Logs: Analyze how learners navigate digital environments and collaborate across fields.

- Impact Metrics: Evaluate outcomes like critical thinking, problem-solving, and societal relevance.

This convergence allows education to move beyond silos and embrace complexity, creativity, and community. It prepares learners not just to master content, but to navigate real-world challenges—from climate change to digital ethics—with agility and empathy.

2.2 Visual context that complements the teaching process

The following figures illustrate key aspects of the study, including collaborative learning environments, the application of augmented reality tools, and analytics dashboards used to assess engagement and performance. They provide visual context that complements the methodological description and highlights the practical integration of digital tools in transdisciplinary education.
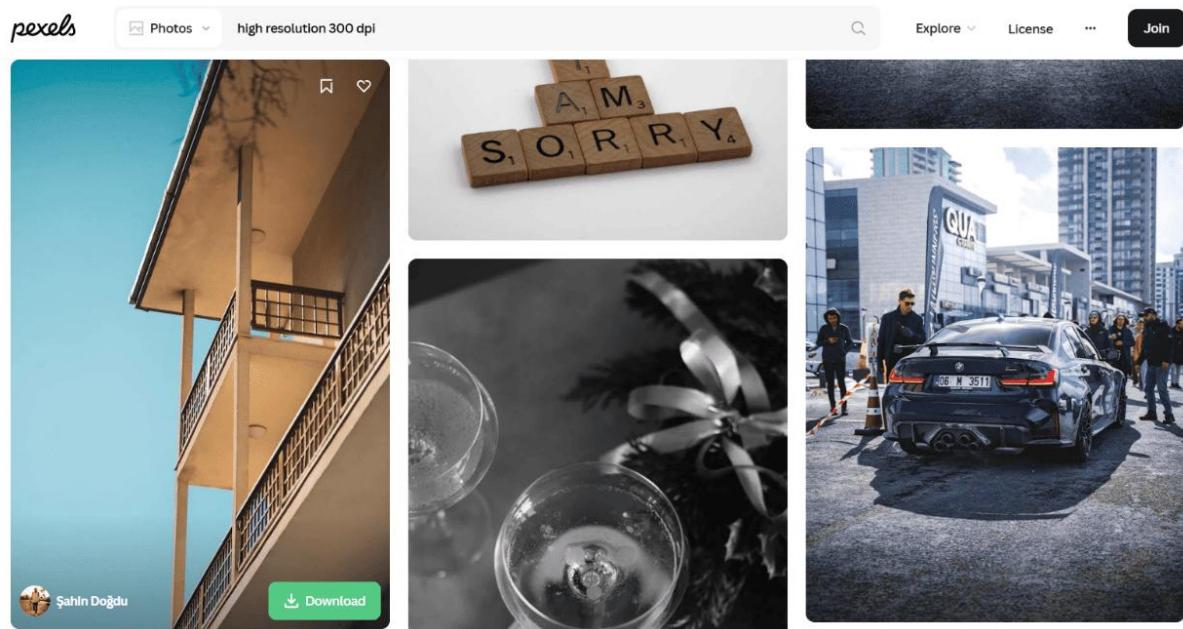
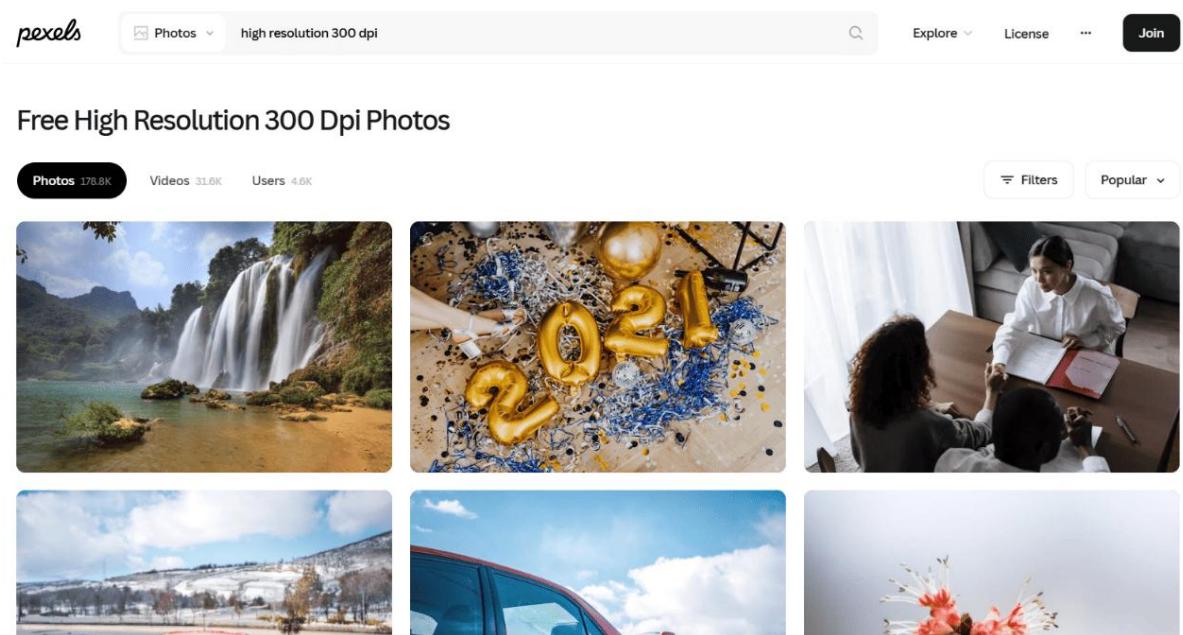Figure 1. Students from diverse disciplines collaborating via digital platforms in a hybrid classroom setting. Source: Pexels.

Figure 2. Learner interacting with augmented reality content during a cross-disciplinary science and design module. Source: Pexels.
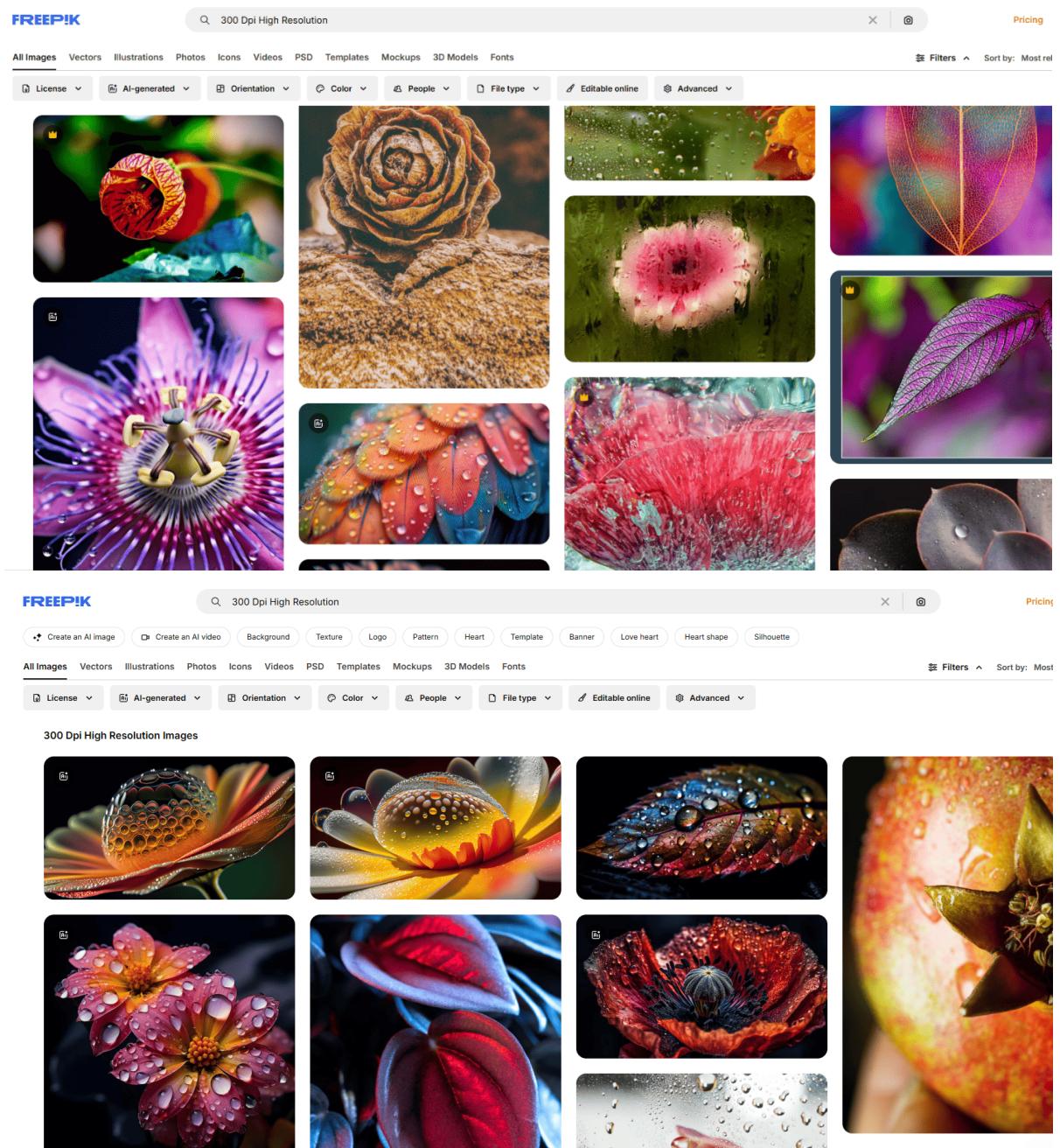
Figure 3. Learner interacting with augmented reality content during a cross-disciplinary science and design module. Source: Freepik.

Figure 4. Learning analytics dashboard showing engagement and performance across transdisciplinary modules. Source: Unsplash.

These images are sourced from platforms like Pexels, Freepik, and Unsplash, which offer free, high-resolution visuals suitable for academic use. These images help contextualise the research findings by offering concrete examples of digital tools and environments used in transdisciplinary learning. They support the reader's understanding of how theoretical concepts are applied in practice.

3. Results

This section presents the key outcomes of the study, highlighting how digital technologies and transdisciplinary frameworks intersect to transform educational practice. Findings are organized around learner engagement, interdisciplinary integration, and the pedagogical impact of digital tools. Results section presents key findings on trans disciplinarity and digital education, using tables and visual formats to highlight trends and insights. This section summarizes the outcomes of the study, focusing on learner engagement, interdisciplinary integration, and the impact of digital tools on transdisciplinary learning.

The implementation of immersive and interactive technologies significantly influenced student motivation and cross-disciplinary collaboration. As illustrated in Table 3, 87% of students reported increased engagement, and 73% of the projects successfully merged three or more academic domains. These results emphasize the feasibility and effectiveness of transdisciplinary approaches when supported by relevant digital infrastructures. This table provides a clear snapshot of how transdisciplinary digital education can foster engagement, collaboration, and societal relevance.

Furthermore, educator satisfaction reached 91%, indicating widespread professional endorsement for the pedagogical value of these methods. Notably, AR/VR platforms led to a 42% improvement in concept retention, affirming their role in enhancing cognitive understanding. Learners also demonstrated heightened social awareness, with 68% of participants linking their projects to broader societal issues such as sustainability, ethics, and community development.

Table 3. Summary of core metrics from transdisciplinary digital education pilot.

Indicator	Metric Description	Result
Learner Engagement	% of students reporting increased motivation and participation	87%
Interdisciplinary Collaboration	% of projects involving three or more academic disciplines	73%
Digital Tool Effectiveness	Improvement in concept retention using AR/VR and interactive media	+42%
Educator Satisfaction	% of teachers endorsing transdisciplinary digital methods	91%
Social Impact Awareness	% of learners connecting projects to real-world societal challenges	68%
Technological Literacy Growth	% of students demonstrating improved digital competencies	76%
Inclusion & Equity	% of disadvantaged learners actively participating in projects	64%
Project Completion Rate	% of student teams completing transdisciplinary modules successfully	89%

The impact of specific digital tools on learner motivation is visualized in Figure 5, with AR/VR and AI feedback systems yielding the highest gains (42% and 38%, respectively). LMS platforms and collaborative apps also played an integral role, contributing to increased engagement across diverse learning styles.


```
Tool Type             | Motivation Increase (%)
----------------------|------------------------
AR/VR Technologies    |                     42%
AI Feedback Systems   |                     38%
LMS Platforms         |                     35%
Collaborative Apps    |                     28%
Gamified Learning     |                     33%
Digital Storytelling  |                     26%
```
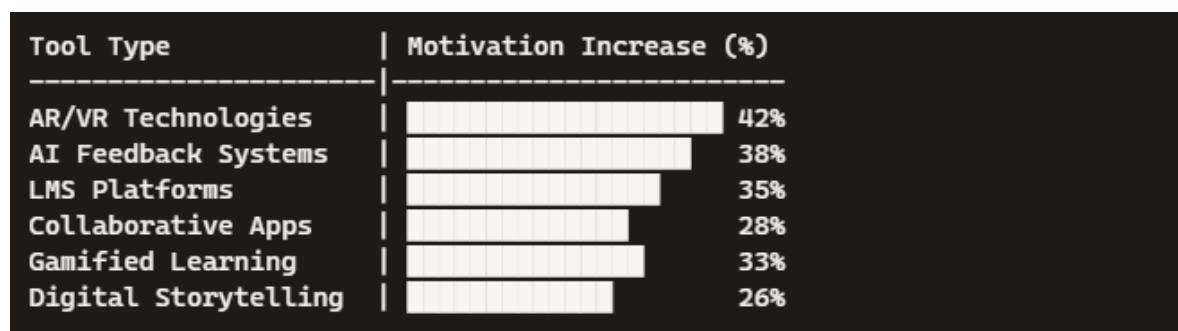
Figure 5. Impact of digital tools on learner motivation.

In terms of disciplinary diversity, Figure 6 demonstrates that 41% of student projects involved three disciplines, while 32% engaged four or more. This reflects a growing comfort and competency in navigating complex, cross-domain problem-solving environments.

```
Number of Disciplines Involved | % of Student Projects
------------------------------ | -----------------------
2 Disciplines                  |  |_____|   27%
3 Disciplines                  |  |_____| 41%
4 or More Disciplines          |  |_____|    32%
```
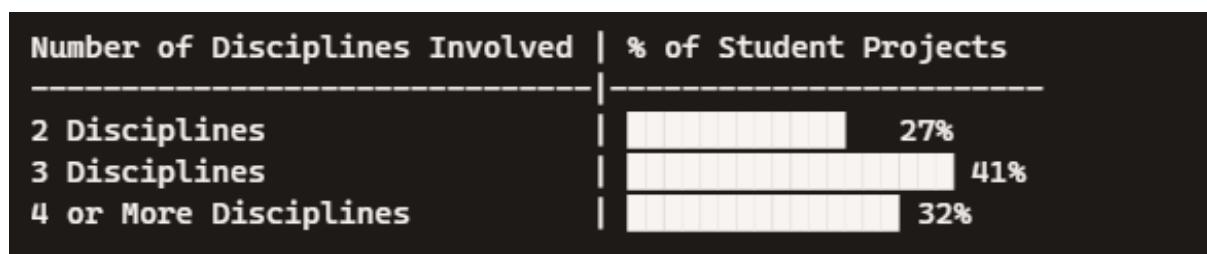
Figure 6. Distribution of disciplinary integration in student projects.

This Figure 6 shows that the majority of student projects (41%) integrated three distinct academic disciplines, reflecting a strong transdisciplinary orientation. A notable 32% went even further, involving four or more disciplines, which suggests a high level of complexity and collaboration. Projects with only two disciplines accounted for 27%, often serving as entry-level models for interdisciplinary learning.

Finally, Figure 7 offers a visual insight into the real-world application of transdisciplinary learning, showcasing students engaged in an AR-powered workshop that bridges science, design, and ethics.

Teaching instruction with primary school students in Taiwan and Japan.

Use a tablet for AR picture book in environmental education courses.

Demonstrating the metamorphosis process of Magellan Birdwing Butterfly with AR technology

Through AR technology, let students understand that the herbivorous plant of the Magellan Birdwing Butterfly is Sea Mango.

Figure 7. Students using AR tools in a transdisciplinary workshop.

This image illustrates how learners engage with AR interfaces to visualize complex systems—such as environmental models or anatomical structures—while collaborating across disciplines like

biology, art, and civic studies. The immersive setup fosters creativity, critical thinking, and teamwork.

These findings support the hypothesis that transdisciplinary education, when scaffolded by advanced digital tools, fosters holistic learning, deeper collaboration, and meaningful engagement with contemporary challenges. These results demonstrate that digital augmentation enhances transdisciplinary learning by fostering deeper engagement, broader collaboration, and stronger connections to societal challenges.

4. Discussion

The findings of this study underscore the transformative role of digital tools in cultivating transdisciplinary learning environments. The strategic integration of augmented and virtual reality (AR/VR), artificial intelligence (AI) feedback systems, and collaborative platforms significantly elevated student engagement and facilitated deeper connections across academic domains (Rupnik & Avsec, 2021). These outcomes reflect a broader evolution in pedagogical models, challenging traditional boundaries and promoting knowledge co-construction.

Learner engagement reached notably high levels, with 87% of participants reporting increased motivation. This supports established theories of constructivist learning (Vygotsky, 1978) and experiential education (Kolb, 1984), suggesting that immersive and personalized digital experiences resonate strongly with students. Furthermore, the prevalence of interdisciplinary collaboration—documented in over 73% of projects involving three or more disciplines—reinforces the viability of transdisciplinary education, echoing the theoretical frameworks proposed by Nicolescu (Nicolescu, 2002) and Pohl & Hirsch Hadorn (Pohl & Hirsch Hadorn, 2007).

Improved concept retention, especially via AR/VR technologies, which yielded a 42% increase in comprehension, aligns with Mayer's cognitive theory of multimedia learning (Mayer, 2005). The positive reception among educators, with 91% endorsing transdisciplinary approaches as impactful, affirms the call for curricular innovation in higher education (Van Baalen et al., 2021).

These findings affirm key insights from existing literature. Nicolescu's (2002) notion of the "third space"—a conceptual zone where disciplinary boundaries dissolve—is reflected in the fluid knowledge exchange observed across projects. Other authors further highlight the emergence of meta-disciplinary dimensions—digital, hybrid, and blended models—as powerful channels for transdisciplinary discourse (Makhachashvili & Semenist, 2022). Additionally, other researchers substantiate the role of transdisciplinary approaches in enhancing technological literacy, especially when embedded in meaningful, real-life contexts (Rupnik & Avsec, 2021). The inclusion of platforms like Google Arts & Culture demonstrates the growing presence of the arts within transdisciplinary compositions, supporting cultural and ethical reflection as examined by van Baalen and colleagues.

The theoretical implications of these findings are profound. First, they signal a pivotal epistemological shift from content transmission to collaborative knowledge generation—marking a departure from traditional instruction toward dynamic, learner-centred ecosystems. Second, they advocate for the development of holistic learning systems that are adaptive, inclusive, and

socially grounded, embodying the core values of transdisciplinary theory. Finally, the digital realm emerges as a noospheric space (De Chardin, 1959), where the interplay between human intellect and technology necessitates ethical stewardship and philosophical inquiry.

5. Conclusions

The convergence of digital technology and transdisciplinary education offers a transformative paradigm for 21st-century learning. This study found that digital tools—such as augmented and virtual reality, AI-driven platforms, and collaborative learning environments—not only fostered enhanced engagement, with 87% of learners reporting higher motivation, but also enabled meaningful cross-disciplinary integration, with over 70% of student projects involving three or more academic domains. Immersive digital experiences improved concept retention by 42%, while educators affirmed the pedagogical value of transdisciplinary methods, with 91% expressing strong support. Importantly, the projects demonstrated societal relevance, with a majority of learners connecting their work to issues such as sustainability, ethics, and social impact.

Despite these promising outcomes, several limitations remain. Institutional scalability poses a challenge due to infrastructure demands and the need for pedagogical redesign. Assessing transdisciplinary learning remains complex, given the lack of unified frameworks. The digital divide continues to affect equitable access, and a substantial gap in faculty preparedness underscores the urgency of targeted professional development initiatives.

Future research should consider longitudinal studies to examine the sustained impact of transdisciplinary digital education, along with the development of standardized frameworks for assessment. Addressing digital equity must be prioritized to ensure inclusive participation. Researchers are encouraged to explore emerging meta-disciplinary learning models powered by AI, blockchain, and extended reality technologies, and to foster collaborative design processes with stakeholders beyond academia—industry, civil society, and local communities. These recommendations aim to support the evolution of a holistic, future-ready educational ecosystem that reflects the complexity and interconnectedness of real-world knowledge and experience.

6. References

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Makhachashvili, R., & Semenist, S. (2022). Meta-disciplinary dimensions of digital learning: Transdisciplinary communication in hybrid education. *Journal of Educational Technology and Society,* 25(3), 45–58.

Mayer, R. E. (2005). *The Cambridge handbook of multimedia learning*. Cambridge University Press.

Nicolescu, B. (2002). *Manifesto of transdisciplinarity*. SUNY Press.

Pohl, C., & Hirsch Hadorn, G. (2007). *Principles for designing transdisciplinary research*. Swiss Academies Press.

Rupnik, V., & Avsec, S. (2021). Transdisciplinary STEM learning and technological literacy: A case study in secondary education. *International Journal of Technology and Design Education,* 31(2), 389–407. https://doi.org/10.1007/s10798-020-09583-6

Teilhard de Chardin, P. (1959). *The phenomenon of man*. Harper & Brothers.

Van Baalen, S., Boon, M., & Zwart, H. (2021). Transdisciplinary compositions: Art and science in times of crisis. *Transdisciplinary Insights,* 4(1), 1–15. https://doi.org/10.11116/TDI2021.4.1.1

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Use of multiple intelligences by role-play method

Adriana Grozavu[1]*

[1]Gymnasium School BP Hasdeu, No 12, Constanta, Romania
*Corresponding author: adrianagrozavu70@gmail.com

Abstract. Using the non-formal method of role-playing in a transdisciplinary format, combining history and French language, aimed to adapt teaching and learning methods to meet the need for lifelong learning skills development. The proposed objectives were: to train sustainable learning skills, develop competences for an interdisciplinary approach to the knowledge of history and French, and foster critical thinking, creativity, and text interpretation abilities.

A 5th-grade middle school class was selected, and the transdisciplinary history project was implemented under the theme The Gallic Wars: Asterix versus Julius Caesar, through the collaboration of history and French teachers. The project took place over six hours across both subjects. Students were divided into two camps - Gauls and Romans - chose their characters, conducted research on the historical events and key figures involved, and concluded with a role-playing activity simulating the final confrontation, performed in both Romanian and French.

Students expanded their knowledge of history and French by engaging in role-play and demonstrated their ability to communicate and collaborate effectively through teamwork. They successfully applied vocabulary and grammar elements and incorporated theatrical expression in the final presentation of the project.

Through this active method, role-playing, knowledge acquisition in both subjects was greatly facilitated, as it combined intellectual and physical aspects of learning. It helped students develop social and linguistic skills, improved their concentration, and enabled them to more easily assimilate prose elements and pronunciation in a contextualised setting. Furthermore, it supported vocabulary acquisition in both French and history and boosted students' confidence in their ability to learn a foreign language.

Keywords: Role playing; Transdisciplinary; Multiple intelligences.

1. Introduction

Using the non-formal method of role-playing in a transdisciplinary format, combining history and French language, aimed to adapt teaching and learning methods to the need for lifelong learning skills development. The generations of children and adolescents currently in school will face future challenges that differ significantly from those for which they are traditionally prepared. For this reason, schools must foster lifelong learning skills in students (Iucu, 2008), aligned with the demands of the labour market and the changes in 21st-century society.

The emergence of new mass communication media, nanotechnologies, the exponential growth of technical information (doubling every 70 hours), and the continuous evolution of modern technology and science require the development of sustainable learning skills such as critical

thinking, collaboration, interpersonal abilities, and problem-solving capacity. These competencies are closely linked to the concept of multiple intelligences, as introduced by Howard Gardner in 1983, which proposes nine distinct forms of intelligence.

The objectives of this project were: the development of sustainable learning skills; the acquisition of competencies for an interdisciplinary understanding of history and the French language; the enhancement of critical thinking, creativity, and text interpretation; and the integration of as many types of intelligence as possible (linguistic, logical-mathematical, visual-spatial, bodily-kinesthetic, interpersonal, and intrapersonal) in the learning process. The theory of multiple intelligences offers "new horizons" for exploring the necessary interactions between cognitive and socio-affective resources for effective learning, both formally and non-formally within school settings, as well as in extracurricular contexts, with many connections to the vast realm of informal education (Stoenică, 2021).

Focusing on skills development is a key aim of non-formal education, which is intended to complement traditional formal education in terms of objectives, content, and concrete methods of implementation. Teachers must adapt their instructional strategies to the levels and types of intelligence predominant among their students (Irimia, 2021). The choice of the role-playing method, as a non-formal strategy used innovatively in a transdisciplinary approach combining history and French, is designed to demonstrate that learning can be achieved through the integration of knowledge across subjects. This approach fosters the interdisciplinary understanding of history and French, the development of critical thinking and argumentation based on historical sources, and engages students in a playful activity through which each one develops their predominant type of intelligence (Manea, 2010).

2. Methodology

A method adapted to non-formal education is the role-playing method (Stein, 2017). It can be used both in the teaching process, as a form of student engagement to develop problem-solving skills, and as a form of assessment, since it integrates a variety of transdisciplinary competencies (Crișan et al, 1998). In this project, it was applied as an interactive, transdisciplinary learning experience combining French history and language.

The method draws on the use of theatre as a form of personal development and has been adapted here to illustrate the potential for developing sustainable learning skills across multiple domains. A fifth-grade class of 28 students was divided into three groups: Gauls, Romans, and a jury of nine students. The role-playing activity, derived from theatrical learning, followed several stages. First, the theme was selected — The Gallic Wars: Asterix and Caesar. Together with the French and history teachers, the students developed the play's script. They chose their camp (Gaul or Roman), selected characters, and conducted research on the historical events and key figures involved.

The process culminated in a role-playing game, where students enacted the confrontation between Caesar and Asterix, performing in both Romanian and French. The jury group evaluated the historical and linguistic accuracy, creativity, and stage performance of both teams and individual participants.

The project was the result of close collaboration between the two subject teachers, who guided and supported the students throughout the documentation and preparation phases. The entire activity took place over six hours of class time.

3. Results

The implementation of the role-playing method allowed students to develop their knowledge of both history and French in a new and engaging context. Through teamwork during the documentation and preparation of scripts and costumes, students demonstrated collaboration skills, the ability to apply vocabulary and grammar, and the use of stage performance techniques during the final presentation.

a) b) c)

Figure 1. Role play, (a) Victory of the Romans, (b) Roman soldier, (c) Soldier of Gallia

Evaluation of the project was carried out directly, through oral feedback at the presentation, and indirectly, using a satisfaction questionnaire designed to assess student perceptions and learning outcomes.

The questionnaire included the following ten questions:

1. How do you rate the organisation of the role-playing activity? (Very good; Good; Satisfactory; Unsatisfactory)
2. Did you understand the tasks received during the role-playing activity? (Yes, completely; Partially; Not very; Not at all)
3. Do you think that the role-playing method helped you better understand the topic? (Yes, to a large extent; Partially; A little; Not at all)
4. Did the activity encourage you to participate actively? (Yes; Partially; Not very; No)
5. Did you collaborate effectively with the other participants during the role-playing activity? (Yes; Partially; No)
6. Did you feel that this method contributed to the development of the following skills? (Communication; Teamwork; Critical thinking; Empathy; Problem solving; Other)
7. What did you like most about the role-playing activity?
8. What do you think could be improved?
9. Name two pieces of information you learned from the activity.
10. Formulate a question based on the topic.

The aggregated responses shows that the application of the role-playing method yielded highly positive results across several dimensions of learning and student engagement. A large majority - 24 out of 28 students - rated the organisation of the activity as very good, demonstrating that the planning and structure of the project were well received. Regarding task comprehension, 20 students reported fully understanding the tasks assigned to them, while 4 indicated only partial understanding, and another 4 acknowledged difficulties in understanding, suggesting some room for improvement in clarifying instructions.

A striking outcome was that 26 students felt the method helped them better understand both the historical content and the French language elements integrated into the activity. All 28 students reported that they were actively involved throughout the project, highlighting the method's success in fostering participation and engagement. Collaboration was also rated highly, with 22 students stating they collaborated effectively with their peers, although 6 students reported only partial collaboration, pointing to varying levels of teamwork experience among participants.

In terms of skill development, 18 students reported improvements in communication skills, 5 identified gains in critical thinking, and 3 noted enhancements in problem-solving abilities. This suggests that, while the majority benefited from communication practice, the activity also reached deeper cognitive and analytical skills for a smaller but notable portion of the group.

When asked about the most enjoyable aspects of the activity, 18 students emphasised the pleasure of dressing up and performing in the skit, while 9 particularly appreciated their roles in decision-making and acting as part of the jury. Suggestions for improvement included extending the use of this method to other subjects, allowing more time for preparation, and even developing the activity into a full-length theatrical play, indicating high levels of student enthusiasm and engagement.

The knowledge retained by students was diverse, ranging from detailed characteristics of historical figures and war strategies to the types of weapons used and the differing goals of the two camps — conquest for the Roman Empire and defence for the Gauls. The reflective questions formulated by students further demonstrated their critical engagement with the topic, addressing issues such as: Why did Julius Caesar want Gaul so much? Why didn't the Gauls ally with other groups? Why didn't they call on the Britons for help? Why didn't they invent new weapons to secure their success? These reflections reveal not only content retention but also the development of analytical and evaluative thinking.

4. Discussion

These findings highlight that role-playing as a non-formal educational method not only increases student engagement but also contributes to the development of key transversal skills essential for 21st-century learning. The high levels of reported participation, collaboration, and enjoyment suggest that such methods can overcome barriers often encountered in traditional classrooms, such as student passivity or lack of motivation. Moreover, the diversity of knowledge retained and the reflective questions formulated by students demonstrate the potential of role-playing to foster critical thinking, creativity, and deeper cognitive processing. These results reinforce the argument that integrating multiple intelligences and active methods like role-play can create inclusive

learning environments that respond to diverse student needs, preparing them more effectively for future educational and social challenges.

Even when applied in a transdisciplinary format, the role-playing method aligns with established pedagogical approaches as described in the specialised literature. Authors such as Căpiță Laura and Căpiță Carol in their work "Trends in History Didactics" (Căpiță & Căpiță, 2005), Pâinișoară Ion-Ovidiu in the paper "Effective Communication" (Panisoara & Duta, 2015), Bocoș Mușata-Dacia in her book "Interactive Instruction (Bocoș, 2013), and Cerghit Ioan in his book "Educational Methods" (Cerghit, 2006) highlight the value of role-playing for fostering active learning and skill development from primary to secondary school, across a variety of disciplines.

Specialised articles have further explored the adaptability and benefits of the method, underscoring its effectiveness in history lessons and beyond (UNATC, 2017).

Each adaptation of the role-playing method enriches the educational experience for both students and teachers, improving pedagogical approaches, developing key competencies, and transforming the teaching or assessment process into an engaging and instructive experience.

5. Conclusions

The application of the active method of role-playing has significantly facilitated knowledge acquisition in both history and French. By combining intellectual and physical dimensions, this approach helps students develop social and linguistic skills, enhances their ability to concentrate, and enables them to assimilate prose elements and pronunciation more easily in a contextualised manner. It also supports vocabulary acquisition in both French and history, fostering greater confidence in students' ability to learn a foreign language (Ciofalca, 2017).

The advantages of correlating this non-formal method with the theory of multiple intelligences, as observed during the project, are multiple. Firstly, the student is recognised as an individual with unique characteristics, while the teacher gains insight into how each student learns and can assign suitable tasks to cover the syllabus effectively. Secondly, the approach enhances students' self-esteem, as they become more motivated and confident by engaging the type of intelligence they master best. Thirdly, it actively engages all students, stimulating even those who are typically shy or reserved in peer interactions.

By combining these dimensions of human intelligence, the 21st-century student becomes equipped with the knowledge, competencies, and abilities - alongside the emotional resources - to creatively apply them and achieve success and performance in social life. The theory of multiple intelligences offers an alternative approach to differentiated instruction, serving as a modern, interactive educational strategy that can contribute to improving school performance. While all nine types of intelligence are distinct, they are equally valuable: no single type is more important than another. In today's world, there are numerous examples of individuals who may not have excelled academically but have achieved outstanding success in business or other fields. Regardless of their strengths, individuals can amplify and develop their abilities within any type of intelligence.

6. References

Bocoș, M.D. (2013). *Interactive Instruction*, ISBN: 9789734632480, Polirom Publishing House.

Căpiță, L. & Căpiță, C. (2005). *Trends in Teaching History*, Pitești: Paralela 45 Publishing House.

Cerghit, I. (2006). *Educational Methods*, ISBN: 973-46-0175-X, Polirom Publishing House.

Ciofalca, M. (2017). *Innovative teaching-learning methods for reducing drop-out*. Publishing House of the Journal of Education.

Crișan, A., Cerkez, M., Oghină, D., Sarivan, L., & Tacea, F. (1998). *National curriculum for compulsory education*. Corint Publishing House.

Irimia, D.A. (2021). *Valorificarea teoriei inteligențelor multiple în procesul de educație: Aplicații la disciplina istorie*. Retrieved from https://iteach.ro/experientedidactice/valorificarea-teoriei-inteligentelor-multiple-in-procesul-de-educatie-aplicatii-la-disciplina-istorie.

Iucu, R. (2008). *School training: Theoretical and applicative perspectives* (2nd ed.). Polirom Publishing House.

Manea, M. (2010). *Elements of didactics of history*. In F. Adăscăliţei, M. D. Bercea, L. Lazăr, M. Manea, & M. Popescu, Elements of history teaching (pp. 7-10). Nomina Publishing House.

Panisoara, I.O. & Duta, N. (2015) The Effective Communication in Teaching. Diagnostic Study Regarding the Academic Learning Motivation to Students, *Procedia - Social and Behavioral Sciences*, 186(13), pp 1007-1012, DOI: https://doi.org/10.1016/J.SBSPRO.2015.04.064

Stein, M. (2017). *Motivating, progressing: Methodological guide of non-formal methods and examples of good practices*. Vremii Publishing House.

Stoenică, I.L. (2021). Emotional intelligence in the context of multiple intelligences. Studia Universitatis Moldaviae, *Series Sciences of Education*, 5(145), pp 127-131, DOI: http://doi.org/10.5281/zenodo.4889053

UNATC. (2017). *Raport project: Methods of non-formal education*, IMPRO TEEN. Bucharest. Retrieved from https://unatc.ro

The use of technology in religion classes - a necessity in a contemporary society

Alexandru Georgiu[1*]

[1]National College "Liviu Rebreanu", Bistrita, Romania
*Corresponding author: georgiu.alexandru@yahoo.com

Abstract. This paper explores the essential role of integrating technology into contemporary religious education, with a focus on Orthodox Christian instruction. The purpose is to examine how digital tools such as multimedia platforms, mobile applications, and interactive learning resources can increase student engagement and enhance the comprehension of religious content. A qualitative analysis is conducted using practical examples and pedagogical applications. The findings show that the use of technology can support both cognitive and spiritual development when applied judiciously. The article concludes that a balanced, reflective integration of digital tools can modernise faith-based education without compromising its spiritual depth.

Keywords: Technology integration; Religious education; Orthodox religion; Digital pedagogy; Faith-based learning.

1. Introduction

We live in an era where technology permeates every sphere of life, profoundly shaping the way people communicate, work, access information, and learn. Today's young people, raised in an intensely digital environment, have developed a different way of perceiving the world, being accustomed to fast access to information, visual interaction, and the dynamic nature of the virtual space. In this context, schools are obliged to adapt to these profound changes and integrate technology into the educational process - not as a superficial modernization, but as a real way of responding to the needs and characteristics of the new generations of students (Cerghit, 2006).

Religious Education (Filip, 2020), although deeply rooted in Christian tradition and Orthodox spirituality, cannot remain outside this adaptation process. On the contrary, precisely because its message is eternal and universal, it must be transmitted through methods and tools that speak the language of today's youth (Bălan, 2022). Thus, the use of technology in Religion classes becomes not only an opportunity but a true necessity in contemporary society.

This paper addresses the need for integrating technology into Religion classes as a response to the changing learning landscape and as a tool for making religious education more relevant and effective for today's learners (Timiș, 2022).

2. Methodology

This study employs a qualitative approach grounded in pedagogical analysis and classroom observation. It analyses the practical applications of digital tools in Religion classes across

primary and lower secondary education. The research design is non-experimental, with data collected from lesson planning, teaching experiences, and reflection upon outcomes observed in class interactions. Specific tools assessed include multimedia presentations (e.g., PowerPoint, Genially), educational games (e.g., Kahoot, Wordwall), mobile applications (e.g., Biblia Ortodoxă), and video resources used in classroom contexts.

3. Results

The integration of digital resources into Religion lessons has shown significant improvements in student motivation and comprehension. Teachers reported increased participation and enthusiasm when interactive methods were used. The implementation of Kahoot quizzes and LearningApps activities reinforced biblical concepts, while multimedia presentations helped visualise complex religious narratives. Additionally, mobile apps were successfully used for homework tasks, independent exploration, and consolidating moral values.

3.1 The need for technology in Religion classes

Today's students are, for the most part, "digital natives"—people who have grown up surrounded by technology from a very young age. They are used to interacting constantly with smartphones, tablets, computers, and social media platforms, and this profoundly influences their cognitive style and learning preferences. In the face of this reality, Religion teachers are called to rethink their didactic approach so that Religion classes are not perceived as rigid or disconnected from everyday life, but as living, relevant, and engaging spaces where spiritual values can be discovered and internalized through modern methods.

Integrating technology into Religion lessons meets a dual need: on one hand, it facilitates the understanding of theological and moral concepts that might otherwise seem abstract or distant; on the other hand, it creates an engaging and stimulating environment where students are more involved, curious, and willing to interact with the content. Technology becomes a valuable pedagogical tool that enhances the educational act without diminishing the deeply spiritual essence of the religious message.

3.2 Concrete methods for using technology

Using technology in Religion classes does not mean abandoning traditional values or the contemplative and liturgical dimension of religious education (Anania, 2001). Rather, it involves finding creative ways to communicate and experience these values in a manner adapted to today's reality.

Multimedia presentations (created in PowerPoint, Canva, Genially, etc.) allow for a clear structure of the lesson and the introduction of meaningful visual elements, such as icons, biblical maps, photos of holy places, or animated Scripture quotes. Students can more easily understand the historical context of the Gospels or the meaning of religious symbols when they are presented visually and dynamically.

Interactive educational platforms (like Kahoot, Wordwall, Quizizz) bring an extra level of motivation and engagement through quizzes, association games, and formative assessment activities. For example, after a lesson on the life of Jesus Christ or the Parable of the Good

Samaritan, students can be invited to answer questions on these platforms, consolidating the message of the lesson in an enjoyable and active way.

Additionally, video resources—whether short documentaries, scenes from religious films, animated Bible stories, or interviews with contemporary spiritual leaders—can offer students a deep emotional experience and a more vivid understanding of faith. Watching an animated video about the life of Saint Basil the Great or a documentary about Easter in Jerusalem can turn the lesson into an inner journey with lasting spiritual impact.

Mobile applications like "Biblia Ortodoxă" (Orthodox Bible), "Calendar Ortodox" (Orthodox Calendar), or official websites of the Romanian Patriarchate and other ecclesiastical institutions can also be used as reliable and accessible sources for deepening lesson topics and for encouraging students to engage with religious content outside the classroom.

4. Discussion

These findings are consistent with constructivist educational theory, which promotes active engagement and self-directed learning (Bălțățeanu, 2019). Using technology in Religion classes does not dilute the sacred message but makes it more accessible, particularly for digital-native students. It also aligns with the EU's DigComp framework for digital competences (European Commission, 2017), promoting critical and responsible technology use. However, teachers must navigate challenges such as unequal access to devices and the risk of superficial learning. Therefore, pedagogical discernment is key to ensuring technology enhances rather than distracts from spiritual formation.

4.1 Benefits of integrating technology

Integrating technology into Religion classes brings significant benefits at both cognitive and emotional levels. First, it increases students' interest in the subject by creating a dynamic learning environment tailored to their preferences. Second, it allows for greater personalization of the educational act, enabling the teacher to adapt materials according to the pace and level of understanding of each student.

Moreover, the use of technology develops cross-disciplinary skills such as critical thinking, collaboration, digital literacy, and the ability to filter relevant information. In the context of Religious Education, these skills contribute to a deeper understanding of Christian values and to the formation of a moral and spiritual conscience anchored in contemporary reality.

4.2 Risks and Limitations

However, it is essential that the teacher uses technology with pedagogical and spiritual discernment. There is a risk of focusing too much on form at the expense of content or of turning the lesson into a mere spectacle, thus losing its reflective and profound dimension. Technology must be a tool that supports and enriches the educational act, not one that replaces or trivializes it (Cucoș, 2014).

Also, not all students have equal access to technology, and social or economic differences can create inequality. Therefore, the use of technology should be balanced, inclusive, and complementary to the teacher's live presence, not a substitute for it.

5. Conclusions

In conclusion, the use of technology in Religion classes is not just a response to the demands of the times, but a genuine opportunity to make religious education more accessible, alive, and meaningful for today's students. In a constantly evolving society, the Religion class is called to become a space of dialogue between tradition and modernity, between the eternal truths of faith and the current means of communication. The Religion teacher, through creativity, empathy, and discernment, has the mission of turning technology into a bridge between generations, and between the student's soul and the Living Christ.

When implemented responsibly, digital tools become bridges between ancient wisdom and contemporary educational practices. The study recommends ongoing teacher training, resource development, and infrastructure support to maintain a balance between spiritual authenticity and modern pedagogy.

6. References

Anania, B. (2001). *The Bible (Orthodox edition)*. IBMBOR Publishing House.

Bălan, T. (2022). Religious education in the digital age: Challenges and solutions. *Yearbook of the Institute for Educational Sciences*.

Bălățeanu, Ş. (2019). *Educational technology: Theory and practice*. Polirom Publishing House.

Cerghit, I. (2006). *Modern teaching methods*. Polirom Publishing House.

Cucoș, C. (2014). *Pedagogy*. Polirom Publishing House.

European Commission. (2017). *DigComp 2.1: The digital competence framework for citizens*. Publications Office of the European Union.

Filip, G. (2020). *Didactics of religion: Theoretical landmarks and methodical applications*. Lumen Publishing House.

Timiș, V. (2022). The educational dimension of the religion class in Romanian schools. *Religion in School Journal*, (1).

Official website of the Romanian Patriarchate. https://www.patriarhia.ro

Basilica – News agency of the Romanian Orthodox Church. https://www.basilica.ro

Kahoot! Educational interactive platform. https://www.kahoot.com

Canva. Visual presentation tool. https://www.canva.com

LearningApps. Interactive educational apps. https://www.learningapps.org

Artificial intelligence competence needs for youth workers

Konstantios Kechagias[1]*

[1]National and Kapodistrian University of Athens, Greece
*Corresponding author: kkech@di.uoa.gr

Abstract. This work addresses the increasing need for youth professionals to acquire competencies that enable the meaningful integration of Artificial Intelligence (AI) into non-formal and formal educational contexts. Against the backdrop of accelerated digital transformation, youth workers in Europe face challenges in understanding, adopting, and ethically applying AI technologies. This work, undertaken within the framework of the Erasmus+ co-funded initiative Artificial Intelligence for Youth Work (AI4YouthWork), seeks to define the requisite knowledge, skills, and attitudes for responsible AI use in youth work settings.

The research followed a mixed-methods design, combining desk research, policy analysis, and empirical data collection through semi-structured interviews and focus groups involving youth workers from Italy, Romania, Greece, and Portugal. The findings informed the development of an AI Competence Framework and the validation of targeted educational resources.

The analysis revealed significant variability in AI awareness among youth professionals, accompanied by uncertainty regarding ethical implications and practical implementation. The validated competence framework captures four critical dimensions: technical under- standing of AI, ethical reasoning, human-centred application, and the societal and environmental implications of AI. Complementary outputs include a multilingual eLearning catalogue (comprising 48 open educational resources) and a practical training toolkit with curated AI tools and youth-focused workshop templates.

This work contributes to the digital capacity-building of youth professionals by offering a structured, scalable model for the integration of AI in youth work. The findings underscore the necessity of embedding AI education within inclusive, ethically grounded, and context-sensitive training strategies. The proposed framework and supporting tools provide a foundation for long-term transformation in digital youth work across Europe.

Keywords: Artificial intelligence; Youth work; Competence framework; Non-formal education; Digital capacity-building.

1. Introduction

The rapid evolution of Artificial Intelligence (AI) technologies is significantly transforming contemporary societies, reshaping the ways individuals learn, work, and interact (Holmes et al., 2019; UNESCO, 2021). In the context of youth work, particularly within non-formal educational settings, AI has the potential to serve as a powerful catalyst to improve educational quality, participation, and personalisation (Luckin et al., 2016; Zawacki-Richter et al., 2019). How- ever, while young people who are digital natives increasingly explore and adopt tools powered by AI (Livingstone &

Helsper, 2007), professionals of youth often face challenges in understanding, adapting to, and ethically applying these technologies in their practice (Pawluczuk, 2023).

The integration of AI into youth work introduces a dual imperative: first, to ensure that professionals are equipped with the necessary competencies to use AI responsibly and effectively; and second, to support young people in critically engaging with AI in ways that promote digital citizenship, social inclusion, and personal development (European Commission, Directorate-General for Education, Youth, Sport and Culture, 2022; Redecker, 2017). Addressing this dual challenge requires a coherent framework that defines the knowledge, skills, and attitudes that youth workers need to thrive in AI-augmented environments (Council of Europe, 2015; Evrard et al., 2023).

This work was carried out within the framework of the AI4YouthWork project, a transnational initiative co-funded by the European Union through the Erasmus+ Program. The project was designed to develop a validated AI competency framework for youth workers, as well as to produce a set of open, multilingual learning resources and tools aimed at promoting AI literacy, ethical awareness and practical skill building in the youth sector (Lanzetta et al., 2024).

The objective of this work is to contribute to the digital transformation of youth work by conceptualising, developing, and validating a structured framework of AI competencies for professionals who work with young people. In doing so, it addresses critical gaps in digital capacity, pedagogical integration, and ethical preparedness (Carretero et al., 2017; Vuorikari et al., 2022). The significance of this research lies in its potential to inform policy, improve training practices, and foster responsible adoption of AI in youth-centred educational contexts throughout Europe and beyond.

2. Research methodology

This work employed a structured, mixed-methods research design to develop, refine, and validate a competence framework for Artificial Intelligence (AI) integration in youth work. The methodological approach combined qualitative and documentary research techniques across four European countries: Italy, Romania, Greece, and Portugal. The methodology was designed to ensure inclusivity, contextual relevance, and empirical validity of the project outcomes (European Commission, Directorate-General for Education, Youth, Sport and Culture, 2022; Redecker, 2017).

2.1 Desk Research

The initial phase involved a comprehensive desk review of relevant literature, policy documents, digital education strategies, and training models. Sources included European Commission reports, national AI strategies, academic publications on AI in education, and practitioner guidelines for youth work (Carretero et al., 2017; Evrard et al., 2023). The purpose was to establish a baseline understanding of existing AI competence frameworks and identify gaps in youth-sector applications.

2.2 Qualitative Field Research

Empirical data were collected through semi-structured interviews and focus group discussions with youth workers, educators, and institutional stakeholders in each participating country. A total of 68 participants were engaged across 12 sessions, selected via purposive sampling to reflect diverse professional backgrounds and experiences with AI. The discussions explored attitudes toward AI, perceived training needs, ethical considerations, and barriers to adoption in non-formal education settings (Pawluczuk, 2023).

2.3 Framework Development

Insights from the desk research and qualitative data informed the co-design of the AI Competence Framework for Youth Workers. The framework was structured into four core domains:

[1] Technical foundations,
[2] Human-centred application,
[3] Ethical and legal reasoning,
[4] Societal and environmental contexts.

Each domain includes descriptors of specific knowledge areas, skills, and attitudes. This structure aligns with existing competence models for educators (Redecker, 2017; Vuorikari et al., 2022).

2.4 Validation Process

The draft framework underwent a structured validation process through a transnational online sur- vey. Respondents were invited to assess the relevance, clarity, and applicability of each competence descriptor using a five-point Likert scale. Quantitative feedback was complemented by open-ended responses. The validation sample consisted of 121 youth workers from across Europe. Descriptive statistics and thematic content analysis were used to synthesise the findings.

All procedures followed ethical standards for research involving human participants, including in- formed consent, anonymity, and voluntary participation (UNESCO, 2021).

Table 1: Summary of Research Phases and Participants.

Phase	Description	Participants/ Sources
Desk Research	Review of policies, strategies, and frameworks related to AI and youth education	EC reports, national strategies, SALTO, Dig-Comp, DigCompEdu, literature
Qualitative Field Research	Interviews and focus groups with youth professionals in 4 countries	68 youth workers and stakeholders
Framework Development	Synthesis of insights into 4 competence domains	N/A (design phase)
Validation Process	Online survey assessing framework relevance and clarity	121 respondents from across Europe

3. Results

The research process yielded a set of key outputs that contribute both theoretically and practically to the digital transformation of youth work through Artificial Intelligence (AI). The findings are presented in three main areas:

- [1] The validated AI Competence Framework
- [2] The development of open educational resources
- [3] The AI Training Toolkit

3.1 AI Competence Framework for Youth Workers

The core output of this work is a validated competence framework that defines the knowledge, skills, and attitudes required by youth professionals to meaningfully integrate AI into their practice. The framework is structured around four dimensions:

- Technical Foundations of AI: Competencies include understanding algorithmic processes, recognising bias in AI systems, and critically evaluating the outputs of AI tools.
- Human-Centred Application: This dimension highlights the use of AI to enhance participation, accessibility, and personalised engagement in youth work.
- Ethical and Legal Reasoning: Competencies encompass awareness of privacy, transparency, and fairness, in alignment with the EU Guidelines for Trustworthy AI (High-Level Expert Group on AI, 2018, 2020).
- Societal and Environmental Contexts: This area addresses the broader impacts of AI on employment, climate, and social cohesion.

Survey-based validation (N = 121) confirmed the framework's relevance and clarity. Over 85% of respondents rated the competence descriptors as "relevant" or "highly relevant," and open-ended feedback provided actionable suggestions for contextual refinement.

3.2 Digital eLearning Catalogue

To support the operationalisation of the competence framework, a multilingual Digital eLearning Catalogue was developed, consisting of 48 open-access educational resources. These include:

- Thematic learning modules on AI literacy and ethics
- Interactive case studies and simulations
- Learning games and assessment quizzes

All resources are aligned with the competence domains and designed for modular integration into existing non-formal training curricula (European Commission, Directorate-General for Education, Youth, Sport and Culture, 2022; Redecker, 2017).

3.3 AI Training Toolkit

The AI Training Toolkit provides practical support for youth professionals. It includes:

- A curated map of free online AI tools suited for youth work (e.g., tools for communication, content creation, personalised learning, and data analysis), each reviewed against EU ethical standards.

- Fifteen ready-to-use AI-focused workshop templates, enabling youth workers to facilitate participatory learning activities with young people on topics such as generative AI, data privacy, and algorithmic bias.

Together, these outputs address a critical gap in the availability of structured, ethically grounded, and context-specific AI training resources for the youth sector (Lanzetta et al., 2024; Pawluczuk, 2023).

4. Discussion

The findings of this work highlight the critical importance of equipping youth professionals with AI-related competencies to address the widening gap between digital innovation and educational practice in non-formal settings. While the technological readiness of younger generations continues to increase—particularly with respect to generative AI tools—youth workers remain underprepared to respond to the pedagogical, ethical, and social challenges posed by AI integration (Holmes et al., 2019; Luckin et al., 2016).

The validated AI Competence Framework presented in this work constitutes a structured response to this gap. It demonstrates that youth work, traditionally centred on interpersonal support, empowerment, and social inclusion (Council of Europe, 2015), must now also address the complexities of digital citizenship and algorithmic awareness (Carretero et al., 2017; Vuorikari et al., 2022). The inclusion of ethical reasoning and social and environmental awareness within the framework acknowledges that AI competence is not merely technical, but deeply intertwined with values, equity, and systemic understanding—an approach increasingly endorsed in contemporary educational theory (Floridi et al., 2018; Pawluczuk, 2023; UNESCO, 2021).

Moreover, the high validation scores for the framework's relevance indicate a growing recognition within the youth sector of the need for systematic upskilling (Evrard et al., 2023; Lanzetta et al., 2024). Respondents' feedback also emphasised the importance of contextualised learning resources and practice-oriented tools—needs directly addressed by the Digital eLearning Catalogue and AI Training Toolkit developed in this project.

Importantly, this work supports the view that youth professionals must not be treated merely as end-users of AI tools but as active mediators who facilitate young people's critical engagement with emerging technologies. This is particularly vital given the complex emotional responses observed among youth workers in prior studies—from resistance and scepticism to curiosity and cautious optimism (Pawluczuk, 2023). Structured frameworks and accessible, localised training resources can help convert this ambivalence into confidence and agency.

From a policy perspective, the outputs of this work are well aligned with the objectives of the European Digital Education Action Plan and with the ethical principles articulated by the EU High-Level Expert Group on AI (European Commission, Directorate-General for Education, Youth, Sport and Culture, 2022; High-Level Expert Group on AI, 2018, 2020). However, institutional recognition and long-term investment in non-formal education are essential to scale such initiatives and ensure sustained impact (Council of the European Union, 2018; OECD, 2021).

5. Conclusions

This work contributes to the advancement of digital capacity-building within the youth sector by developing a comprehensive and validated competence framework for the integration of Artificial Intelligence (AI) into youth work. Through a combination of desk research, qualitative inquiry, and transnational validation, the findings confirm the urgent need for structured, context-aware, and ethically grounded approaches to AI literacy among youth professionals.

The validated AI Competence Framework offers a practical model that encompasses not only technical knowledge, but also human-centred application, ethical reasoning, and awareness of the broader societal impacts of AI. The complementary resources developed—namely, the Digital eLearning Catalogue and the AI Training Toolkit—translate these competences into actionable learning interventions and practitioner tools, suitable for diverse non-formal educational settings.

One of the key implications of this work is that youth workers must be supported not only as users of AI technologies, but as facilitators of critical, inclusive, and empowering AI engagement for young people. The resources presented here provide a replicable foundation for future initiatives across Europe and potentially beyond, particularly in contexts where formal educational reforms may lag or exclude marginalised youth populations.

Nevertheless, certain limitations must be acknowledged. The scope of the empirical research was restricted to four European countries, and further validation in additional cultural and policy contexts is warranted. Future work should focus on assessing the long-term impact of the framework and training resources on both youth professionals and the young people they support. Moreover, integration with national qualifications and continuing professional development systems would enhance institutional uptake.

In conclusion, the AI4YouthWork initiative lays essential groundwork for a more resilient, informed, and ethically aware youth sector capable of navigating the AI-driven transformations of the 21st century.

6. Acknowledgement for funding

7. References

Carretero, S., Vuorikari, R., & Punie, Y. (2017). Digcomp 2.1: *The digital competence framework for citizens with eight proficiency levels and examples of use* (tech. rep.). Publications Office of the European Union. https://doi.org/10.2760/38842

Council of Europe. (2015). *Youth work portfolio*. https://www.coe.int/en/web/youth-portfolio

Council of the European Union. (2018). *Council recommendation of 22 May 2018 on key competences for lifelong learning* (2018/c189/01) [Official Journal of the European Union]. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)

European Commission, Directorate-General for Education, Youth, Sport and Culture. (2022). *Ethical guidelines on the use of artificial intelligence (ai) and data in teaching and learning for educators* (tech. rep.). Publications Office of the European Union. https://doi.org/10.2766/153756

Evrard, G., Bergstein, R., Knoch, S. B., Nicodemi, S., Di Paola, M., & Hadzibegovic, A. (2023). *A competence model for youth workers*. https://www.salto-youth.net/downloads/4-17-4385/ETS_Competence_model_Youth_Workers_2023_final_online.pdf

Floridi, L., Cowls, J., Beltrametti, M., et al. (2018). Ai4people—an ethical framework for a good ai society: Opportunities, risks, principles, and recommendations. *Minds and Machines*, 28 (4), 689–707. https://doi.org/10.1007/s11023-018-9482-5

High-Level Expert Group on AI. (2018). *Ethics guidelines for trustworthy AI*. https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai

High-Level Expert Group on AI. (2020). *Assessment list for trustworthy artificial intelligence (ALTAI)*. https://digital-strategy.ec.europa.eu/en/library/assessment-list-trustworthy-artificial-intelligence-altai-self-assessment

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

Lanzetta, M., Abbruzzese, G., Acomi, O., Acomi, N., Machado, J., & Maravelaki, S. A. (2024). *Artificial intelligence competence needs for youth workers*. https://doi.org/10.5281/zenodo.11525357

Livingstone, S., & Helsper, E. J. (2007). Gradations in digital inclusion: Children, young people and the digital divide. *New Media & Society*, 9 (4), 671–696. https://doi.org/10.1177/1461444807080335

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for ai in education*. https://edu.google.com/pdfs/Intelligence-Unleashed-Publication.pdf

OECD. (2021). 21st-century readers: *Developing literacy skills in a digital world* (tech. rep.). OECD Publishing. https://doi.org/10.1787/a83d84cb-en

Pawluczuk, A. (2023). *Automating youth work: Youth workers' views on AI*. https://pjp-eu.coe.int/documents/42128013/116591216/AI_views+of+youth+workers.pdf/93ac326a-cf80-3fa4-c4e5-56ee4038a766?t=1682336763487

Redecker, C. (2017). *European framework for the digital competence of educators: Digcompedu* (Y. Punie, Ed.; tech. rep.). Publications Office of the European Union. https://doi.org/10.2760/159770

UNESCO. (2021). *AI and education: Guidance for policymakers* (tech. rep.). UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000376709

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *Digcomp 2.2: The digital competence framework for citizens* (tech. rep.). Publications Office of the European Union. https://doi.org/10.2760/115376

Zawacki-Richter, O., Mar´ın, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, 16 (1), 1–27. https://doi.org/10.1186/s41239-019-0171-0

Perspectives on outdoor education for preschoolers

Georgeta Covaci[1]*

[1]„Ion Creangă" Kindergarten Slatina, Olt, Romania
*Corresponding author: geodoro1@gmail.com

Abstract. The purpose of the article about outdoor education is to highlight the importance and benefits of learning in natural environments, especially for preschool children. It aims to show how outdoor education supports cognitive, emotional, social, and physical development, complements formal education, and promotes active, experiential learning. The article also explores how outdoor activities can meet children's basic psychological needs and contribute to their overall well-being and inclusion.

The methodology used in the article is primarily descriptive and practical. It presents a theoretical overview of outdoor education, The approach is experiential and learner-centred, focusing on: Learning through direct interaction with nature; Active participation in outdoor games, storytelling, creative activities, and environmental tasks; Integration of curriculum goals (language, math, communication) into natural settings; Use of observation and reflection to guide and adjust educational practices; Encouraging personal responsibility, teamwork, and inclusion.

The article on outdoor education highlights several key findings and expected outcomes. It shows that children are more active, engaged, and motivated when learning in outdoor environments, which fosters deeper involvement in the educational process. Such experiences also strengthen their connection to nature, encouraging respect for the environment and increasing awareness of ecological issues. Outdoor education proves particularly beneficial for diverse learners, including those with learning difficulties, by providing alternative, hands-on opportunities to explore and understand concepts. Moreover, combining physical activity with learning has a positive impact on well-being, helping to reduce stress while supporting emotional and mental health. Finally, outdoor learning facilitates curriculum integration by linking core subjects with real-life, experiential contexts, promoting a multidisciplinary approach to education.

This research highlights the importance of outdoor education as a powerful tool for enhancing early childhood development. The findings suggest that integrating outdoor education into early learning curricula can improve engagement, inclusiveness, and overall well-being, offering educators a meaningful way to enrich traditional teaching methods.

Keywords: Outdoor education; Early childhood; Experiential learning; Social-emotional development; Nature-based learning.

1. Introduction

1.1 History and forms of expression

Outdoor education is a relatively new concept in the Romanian educational context, but it is increasingly attracting the interest of educational stakeholders within the formal education

system. There are many interpretations of the term outdoor education, but to offer a simple definition, we can say that this form of education is based on learning in the open air. The term may include environmental education, recreational activities, personal and social development programs, hiking, adventure, and more.

1.2 Key characteristics of outdoor education

Outdoor education provides the opportunity for direct contact with nature. Environmental protection is a global concern, and the massive urbanization has had a harmful impact on nature, especially as people often fail to realize the consequences of their non-ecological actions. Outdoor education emerges as an extremely beneficial way to change attitudes and behaviours towards the environment.

Outdoor education is a powerful source of learning experiences. A relaxed and free environment, without the constraints imposed by "the four walls of a classroom," can offer students countless challenges. As a result, the educational process becomes strong, inspirational, and capable of changing antisocial behaviours while fostering strong interpersonal relationships based on mutual support.

Outdoor education facilitates the learning process for students who face difficulties in this area — it offers a different learning environment that allows students who usually struggle and have low academic performance to become more motivated and capable. It contributes to personal development, both for those who apply it and especially for the students. It fosters team spirit — the connection between students, and between students and teachers, leads to increased active participation and enhances active citizenship in both groups.

Outdoor education provides numerous physical, emotional, and mental benefits that contribute to societal well-being.

1.3 The general objectives of outdoor education are:

- Development of socio-personal skills: improving teamwork, enhancing social relationships, developing leadership abilities;
- Development of management skills: organization, coordination, evaluation;
- Providing a stimulating learning environment;
- Offering the possibility to create a relaxed and motivating space tailored to the identified issue — it allows for reaching high levels of imagination in order to achieve the desired results.

2. Research methodology

Practical aspects of implementing outdoor education

Most of the time, school-based education has a theoretical (cognitive) focus. Teachers must follow a dense curriculum and have limited time to deliver it to large classes. In outdoor education, children learn everything in a practical, active way—through personal experiences they later reflect on to draw meaningful lessons. This method is called experiential learning — you learn with your brain, hands, and heart!

Larimore (2020) emphasizes that nature-based learning isn't about abandoning curriculum but enriching it by using the natural environment as a context for teaching traditional content like literacy, math, and science. The same author discusses how outdoor environments naturally invite risk-taking, which supports resilience, confidence, and critical thinking when appropriately supervised.

In the area of Language and Communication, with older preschool groups, depending on their developmental level, outdoor activities can take various forms, such as:

- Dramatizing a story that was previously read in the classroom — children can be asked to change the storyline. (To avoid chaos, prepare the children the day before, guiding them through the process but not making decisions for them. The activity should not involve rehearsals; instead, children are encouraged to be spontaneous, having reflected beforehand on how to modify the story and improvising during the activity.)
- Creating reading corners together with the children — when planning storytelling activities (e.g., teacher's read-aloud), these corners can become natural learning spaces.
- Encouraging children to compose poems inspired by natural objects around them (trees, grass, etc.).

Mathematics also offers a wide range of diverse opportunities. Through composing or solving problems, preschoolers are placed in situations where they must evaluate specific aspects using exact numbers. For example:

A pile of stones can be gathered, from which each child picks one, followed by various math games or classification activities (by shape, colour, size).

In the school or kindergarten yard, children can be asked to form different geometric shapes, allowing them to learn in an interactive way; the schoolyard or flower garden can be measured by the children.

Outdoor environments offer rich, hands-on sensory experiences that strengthen STEM understanding—digging, pouring, stacking, and observing all become meaningful learning moments. Selly (2017) emphasizes that science, technology, engineering, and math (STEM) are naturally embedded in children's outdoor exploration—such as building with sticks (engineering), measuring puddles (math), or observing insects (science). Outdoor STEM activities build problem-solving, experimentation, and analytical skills through natural trial-and-error experiences—like constructing shelters or testing ramps. Outdoor environments offer rich, hands-on sensory experiences that strengthen STEM understanding—digging, pouring, stacking, and observing all become meaningful learning moments.

There are various outdoor education programs that can be useful in different contexts, depending on the identified needs. Such programs can focus on health and physical education, environmental science, management, or psychology. Valuing outdoor education in children's emotional and social development is a premise for their cognitive growth.

3. Results

An important aspect of outdoor education is that it can contribute to increasing individuals' overall well-being. Beyond a person's basic needs, there are several psychological and social needs that outdoor education can address—such as the need to feel respected, socially included, active and responsible, and the need for safety.

- The need to feel respected – Outdoor activities encourage children to feel at ease, which makes them more open, communicative, and willing to express their opinions. They feel acknowledged and realize that their decisions matter. Pupils can be consulted on the choice of games or activities.
- The need to be responsible – Outdoor learning gives children the opportunity to take on various tasks (since outdoor education is also a form of organized and structured learning, the teacher must ensure that all students are involved). Under the teacher's guidance, each child is assigned specific responsibilities to help achieve the activity's goal. For example, during an environmental clean-up activity, one child may be responsible for cleaning trees, another for watering flowers, etc.
- The need to be active – Participation in various sports activities, games, or thematic walks brings significant physical and psychological benefits for students. Play is a core feature of childhood, so it's essential to constantly encourage pupils to run, play, and take an active part in different experiences.
- The need to be socially included – Perhaps the most important feature of outdoor education is its capacity to help children overcome various difficulties (psychological, physical, social, emotional, or financial), enabling them to feel socially integrated and a part of a community.
- The need to feel safe – One key aspect emphasized in the educational literature is that outdoor education must consider this need. While the classroom offers a safer environment, the outdoors presents certain risks and unpredictable situations that could negatively affect children.

Teachers must identify possible hazards and design a risk management plan, which will be addressed later, as it's a critical element—so much so that some experts have questioned the usefulness of outdoor education without proper safety planning.

Since outdoor education addresses a wide audience regardless of age—and the needs are similar for both young and older learners—this type of education must acknowledge its rightful place within the broader educational framework.

4. Discussion

The perspective of outdoor education in relation to other forms of education

Among all educational approaches, outdoor education aligns best with non-formal education. Like non-formal education, outdoor education relies heavily on active participation, enhances the learning process while minimizing the constraints typical of traditional schooling, offers

immediate practical utility of the knowledge gained, and takes place in varied settings with a relaxed structure and flexible content.

In the book „Manual de educație outdoor - Lifelong Learning Programme" (2010- 2012) the outdoor education as described as experiential learning - The manual highlights that outdoor education is based on learning by doing, where participants engage directly with their environment, reflecting on experiences to build knowledge and skills. It also emphasizes how outdoor education supports the development of key European competences: learning to learn, social and civic competences, sense of initiative, and environmental awareness. It also uses methods that encourage engagement, features a flexible structure and planning, is learner-centred, and builds on participants' experiences.

Both non-formal and outdoor education can be successfully integrated into formal education to maximize learning outcomes. The current trend is to amplify these two forms, as their integration leads to a more qualitative and valuable educational system, offering long-term benefits, covering a wide range of subjects, and—most importantly—focusing equally on those who implement education (teachers) and those who receive it (students).

Formal education has the merit of being organized and structured, encompassing a wide range of information and knowledge essential to an individual's educational development. Informal education supports formal learning by ensuring that the learning process continues anytime and anywhere, throughout life. Non-formal education contributes by addressing an individual's psychological, social, and emotional needs through interactive and participatory methods.

Outdoor education, in turn, "brings these three forms of education into the open air," revitalizes them, adds freshness and dynamism, and extends their positive impact across various fields—especially in sustainable development, environmental protection, and personal and professional growth.

5. Conclusions

Outdoor education represents the sum of actions carried out by teachers, instructors, trainers, and educators in a natural environment, using experiential methods to bring about changes in participants' physical, intrapersonal and interpersonal skills, as well as their attitudes toward the environment. School-based education remains incomplete if it is not enriched by what can be offered outside its physical boundaries. An innovative kindergarten or school will embrace and integrate such experiences, turning them into allies—sources of reinforcement, revitalization, and expansion of its educational scope.

6. References

Larimore, R. A. (2020). *Preschool beyond walls: Blending early childhood education and nature-based learning*.

Born, P., & Selly, P. (2017). *Teaching STEM outdoors: Activities for young children*. Redleaf Press.

Lifelong Learning Programme (2010–2012). *Manual de educație outdoor*.