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

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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

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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.

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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

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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

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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.

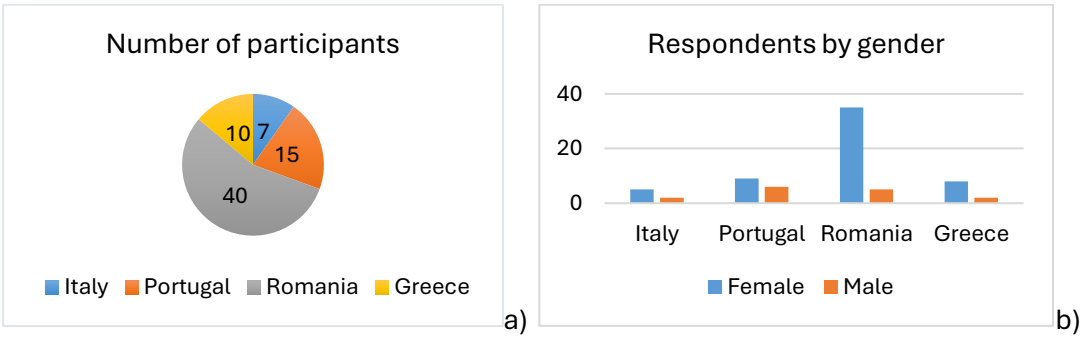

Figure 1. Respondents distribution (a) By country, (b) By gender

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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

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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.

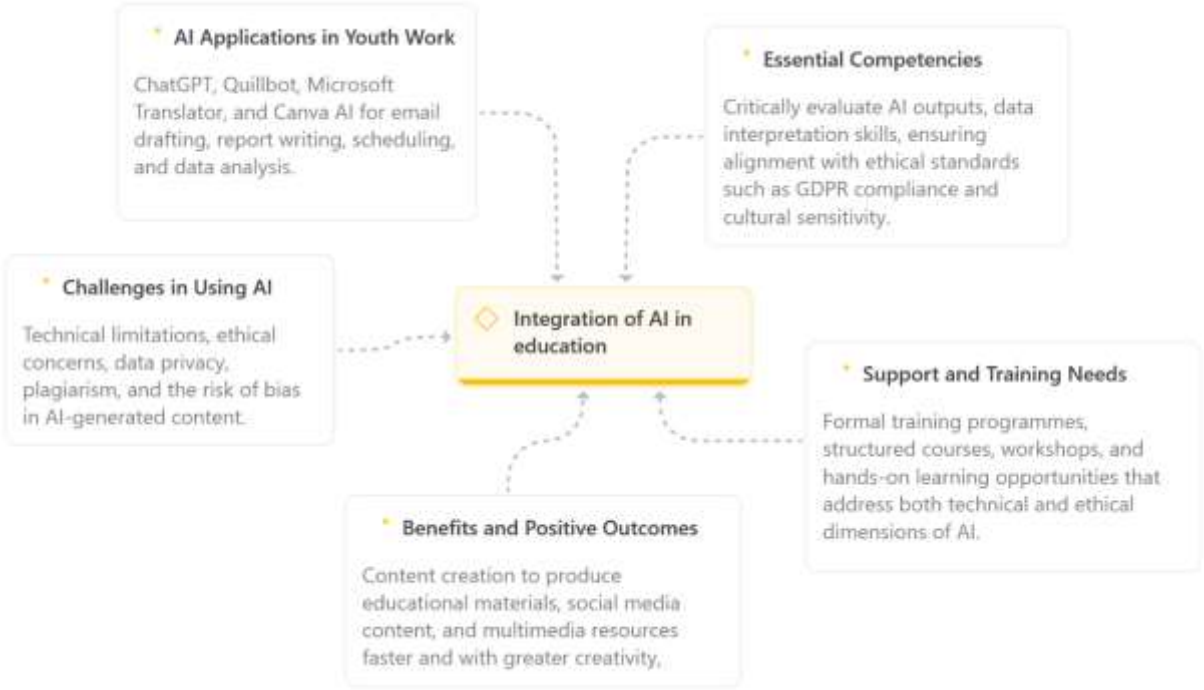

Figure 2. Thematic map

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

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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.

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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.

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