

Designing AI training paths for youth workers: Evidence from a European pilot initiative

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Abstract. Artificial Intelligence (AI) is increasingly shaping the social, educational, and civic environments in which young people live and learn, creating new challenges and opportunities for youth workers. Despite the growing relevance of AI, structured and context-sensitive training opportunities for youth workers remain limited. This study explores how an AI training path can be designed to support youth workers' competence development in ways that are critical, ethical and practically relevant to their professional roles by analysing a pilot training initiative developed within the Artificial Intelligence for Youth Work (AI4YouthWork) project, a cooperation partnership co-funded by the Erasmus+ Programme of the European Union. A mixed-methods research design was adopted, combining post-training survey data with platform analytics. Quantitative data captured participants' perceptions of learning outcomes, relevance and readiness to engage with AI, while qualitative responses provided insights into perceived usability, meaningfulness, and design strengths. A total of 112 participants from diverse European countries and professional backgrounds took part in the study. Findings indicate that the training path supported perceived improvements in AI-related knowledge, skills, confidence, and readiness across participants with heterogeneous levels of prior AI familiarity. The modular and flexible design enabled differentiated engagement, while strong contextualisation and ethical framing enhanced perceived relevance. Participants valued learning experiences that connected AI to youth work values, professional identity and everyday practice rather than focusing solely on technical functionalities. The study concludes that AI competence development for youth workers is most effective when training paths are modular, practice-oriented, ethically grounded and aligned with non-formal education principles. These findings offer design-oriented insights to inform future professional learning initiatives in the youth work field.

Keywords: Artificial intelligence; Youth work; Non-formal education; Professional development; AI competence.

1. Introduction

Artificial Intelligence (AI) has rapidly become embedded in the everyday environments of young people, shaping how they communicate, learn, access information and participate in society (European Commission, 2022). Algorithmic recommendation systems, generative AI tools and data-driven platforms increasingly mediate young people's social, educational and civic experiences. As these technologies continue to evolve, their implications extend beyond technical domains into questions of inclusion, agency, ethics and power (Kechagias, 2025).

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Within this context, youth workers play a critical role as educators, facilitators and mediators. Positioned at the intersection of education, social support and community engagement, youth workers are uniquely placed to help young people critically engage with AI-driven environments, understand their opportunities and risks and develop responsible and informed forms of participation (Pawluczuk, 2023). This role is particularly salient in non-formal education settings, where learning is voluntary, learner-centred and closely connected to young people's lived realities.

Despite this growing relevance, there remains a significant gap in structured AI competence development opportunities for youth workers. Although AI-related training initiatives and conceptual frameworks have emerged in recent years, available learning offers frequently remain partially aligned with the competence needs of youth workers and the values, practices and constraints of non-formal education. Designing AI training for youth workers requires careful consideration of non-formal learning principles, competence-oriented professional development and the ethical and practical dimensions of AI use in youth-related contexts.

This study responds to this challenge by examining how an AI training path for youth workers can be designed to address their competence needs and professional realities. By analysing participants' perceptions, learning experiences and engagement patterns during a pilot training initiative - implemented in the scope of the "Artificial Intelligence for Youth Work" (AI4YouthWork) project, co-funded by the Erasmus+ Programme of the European Union -, the study aims to generate design-oriented insights that can inform future AI professional learning initiatives in the youth work field.

Particularly, the study is guided by the following research questions:

- Main research question (MRQ): How can youth workers be effectively equipped with AI competences to engage critically, ethically and practically with AI in youth work contexts?
- Sub-research question 1 (Sub-RQ1): How can AI training paths be designed to meaningfully support youth workers' competence development?
- Sub-research question 2 (Sub-RQ2): Which design characteristics make AI training relevant, usable and meaningful for youth workers' professional needs and contexts?

2. Conceptual background

The conceptual foundations of this study are grounded in an understanding of AI competences for youth workers as a coherent set of knowledge, skills and attitudes required to meaningfully integrate AI into youth work practice and to support young people in developing responsible and informed engagement with AI. This understanding is informed by the AI Competence Framework for Youth Workers proposed by Lanzetta et al. (2024), which conceptualises AI competence in relation to youth workers' values and responsibilities in non-formal education contexts.

Within this framework, AI competence is articulated as a set of professional capacities organised across multiple competence areas that reflect the diverse dimensions of youth work practice. These areas address how AI intersects with professional engagement, the use and creation of AI-powered resources, the design and facilitation of learning, assessment and evaluation practices,

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the empowerment and inclusion of young people and the facilitation of young people's own AI competences.

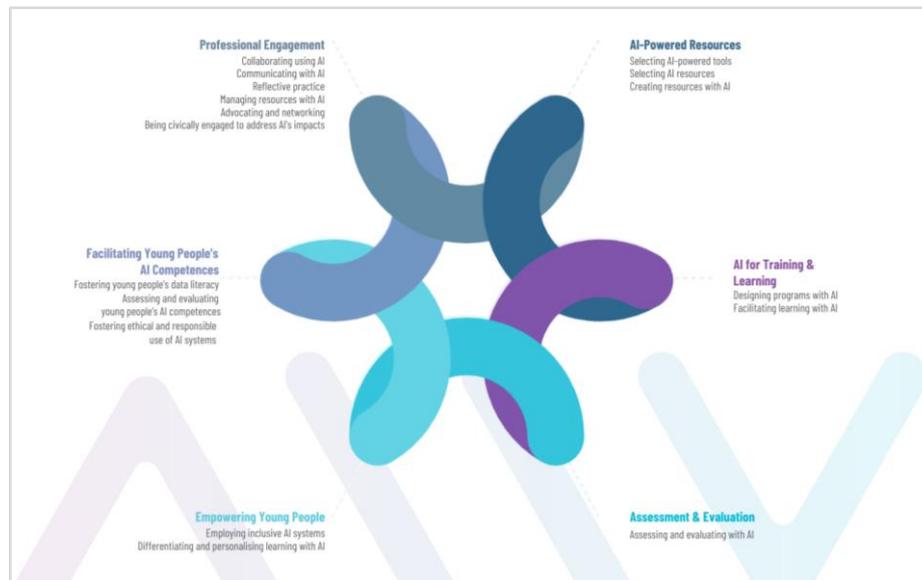


Figure 1. AI Competence Framework for Youth Workers

From this perspective, AI competence encompasses the understanding of how AI systems function and where they are embedded in young people's everyday environments and the attitudes and skills needed to critically assess the opportunities and risks associated with AI use in youth work contexts, to make informed and responsible decisions about whether, when and how to engage with AI-powered tools and to support young people in developing critical awareness and ethical understanding of AI.

Hence, the framework emphasises the integration of AI into existing youth work practices and professional roles. This orientation reflects evidence from research (Lanzetta et al., 2024; Acomi, N. & Acomi, O.C, 2025) and validation activities (Acomi, 2024) indicating that youth workers value AI-related learning when it is clearly connected to their everyday work with young people and aligned with youth work values.

In addition, the framework highlights the dual role of youth workers as both AI users and facilitators of young people's AI competence development. Youth workers are expected not only to engage responsibly with AI in their own practice, but also to support young people in developing data literacy, ethical awareness and responsible AI engagement.

3. Methodology

This study examines how youth workers can be equipped with AI competences through the design of a competence-oriented AI training path. The focus is on participants' perceptions of learning outcomes, relevance and engagement, as well as on how specific design choices are experienced by learners. A mixed-methods approach was adopted, combining quantitative and qualitative data sources to support a design-oriented and exploratory analysis.

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3.1 Research design

The study was designed as a mixed-methods pilot study centred on youth workers’ experiences with an AI training path developed within the AI4YouthWork initiative for non-formal education contexts. The pilot design enabled the collection of both quantitative data on perceived learning outcomes and engagement and qualitative data capturing participants’ interpretations of relevance, usability and meaning, in line with established mixed-methods research approaches integrating complementary data sources to address exploratory research questions (Creswell & Plano Clark, 2018).

In line with principles of educational design research, the study aimed to generate practice-informed insights and design considerations rather than to test causal effects or generalisable outcomes (McKenney & Reeves, 2019).

Data related to perceived improvements in AI-related knowledge, skills, confidence and readiness to engage with AI informed SRQ1. Data related to perceived relevance, applicability, usability and meaningfulness of the training design informed SRQ2. Together, these data sources supported an integrated response to the main research question.

3.2 Context of the study

The study was conducted in the context of a pilot AI training initiative targeting youth workers and professionals working in youth-related fields. The training was delivered between April and June 2025 as a fully online, self-paced learning experience designed to accommodate the time constraints and diverse professional backgrounds.

The training path was structured into 48 modular learning units aligned with the key competence areas defined in the AI Competence Framework for Youth Workers. As summarised in Table 1, the units addressed a range of topics including understanding AI in youth-related contexts, ethical and responsible AI use, AI-supported professional engagement and learning activities, inclusion and accessibility, assessment and evaluation and supporting young people’s own AI competence development. The learning units combined concise explanatory texts with practical examples, reflective prompts and applied activities designed to support contextualised and practice-oriented learning. Participants were free to engage with the learning units flexibly, selecting modules according to their interests and professional needs.

Table 1. Structure of the AI Training Path and Alignment with Competence Areas

Competence Area	Training Content and Focus
N/A (Cross-cutting)	Introduction to Artificial Intelligence in youth-related contexts
	The role of youth workers in the AI-driven societal transformation
	Overview of the AI Competence Framework for Youth Workers (Part 1: structure and rationale)
	Overview of the AI Competence Framework for Youth Workers (Part 2: competence areas and progression)

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Area 1: Professional Engagement	Collaborating using AI: Use of AI-enabled collaboration tools to support teamwork and coordination in youth work contexts
	Communicating with AI: Enhancing communication through AI-powered tools (e.g. chatbots, translation and language support systems); promoting inclusive and multilingual communication
	Reflective practice: Reflecting on the ethical, social and practical implications of AI use in youth work; using AI-supported tools to support reflective practice and professional learning
	Managing resources with AI: AI-supported resource and project management to enhance organisational efficiency and decision-making
	Advocacy and networking: Advocating for trustworthy and responsible AI; building partnerships with stakeholders in AI, education and youth work
	Civic engagement: Understanding the multidimensional societal impacts of AI and engaging young people in civic dialogue on AI-related issues
	<i>Assessment:</i> Final quiz – Professional Engagement
Area 2: AI-Powered Resources	Selecting AI-powered tools: Criteria for selecting AI tools based on usability, trustworthiness and ethical considerations
	Selecting AI-related resources: Curating and evaluating AI learning resources aligned with youth work objectives
	Creating resources with AI: Using generative AI tools to develop learning and support materials for youth work
	Prompt engineering foundations: Crafting effective prompts and applying prompting patterns to optimise AI outputs
	Automating resource creation: Using AI to streamline the creation of templates, surveys and reports
	<i>Assessment:</i> Final quiz – AI-Powered Resources
Area 3: AI Training and Learning	Designing programmes with AI: Using AI to support ideation, planning and promotion of youth programmes
	Personalised and adaptive learning: Leveraging AI to create personalised learning pathways in non-formal education
	AI-enhanced programme design: Developing innovative and interactive learning experiences using AI
	Facilitating learning with AI: Supporting group learning, collaboration and youth development through AI-enabled tools
	<i>Assessment:</i> Final quiz – AI Training and Learning
Area 4: Assessment and Evaluation	Assessing learning with AI: Introduction to AI-powered assessment tools for monitoring individual and group progress
	Feedback and data-informed evaluation: Using AI-generated insights to support formative feedback and learning improvement

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	<p>Ethical considerations: Addressing fairness, transparency, data protection and accountability in AI-supported assessment</p> <p><i>Assessment:</i> Final quiz – Assessment and Evaluation</p>
Area 5: Empowering Young People	<p>Inclusive AI systems: Using AI tools to promote accessibility, inclusion and participation in youth work</p>
	<p>Understanding and mitigating AI bias: Identifying sources of algorithmic bias and strategies for mitigation</p>
	<p>Differentiation and personalisation: Using AI to tailor learning and development experiences to young people’s needs</p>
	<p><i>Assessment:</i> Final quiz – Empowering Young People</p>
Area 6: Facilitating Young People’s AI Competence	<p>Data literacy: Supporting young people in understanding data, its uses and its implications in AI systems</p>
	<p>Assessing AI competences: Defining AI competence and using tools to support its assessment and development</p>
	<p>Ethical and responsible AI use: Introducing ethical guidelines for trustworthy AI, data protection and privacy</p>
	<p>Policy and ethical frameworks: Engaging with European and international guidelines on AI ethics in education</p>
	<p><i>Assessment:</i> Final quiz – Facilitating Young People’s AI Competence</p>

3.3 Participants

A total of 112 participants took part in the study and completed the post-training survey. Participants were youth workers (64%), representatives of youth organisations (23%), providers of Continuous Professional Development for youth workers (9%) and policy-/decision-makers in the youth field (4%). The majority of participants identified as female (60%), with male participants comprising 39% of the group and 1% choosing not to specify their gender.

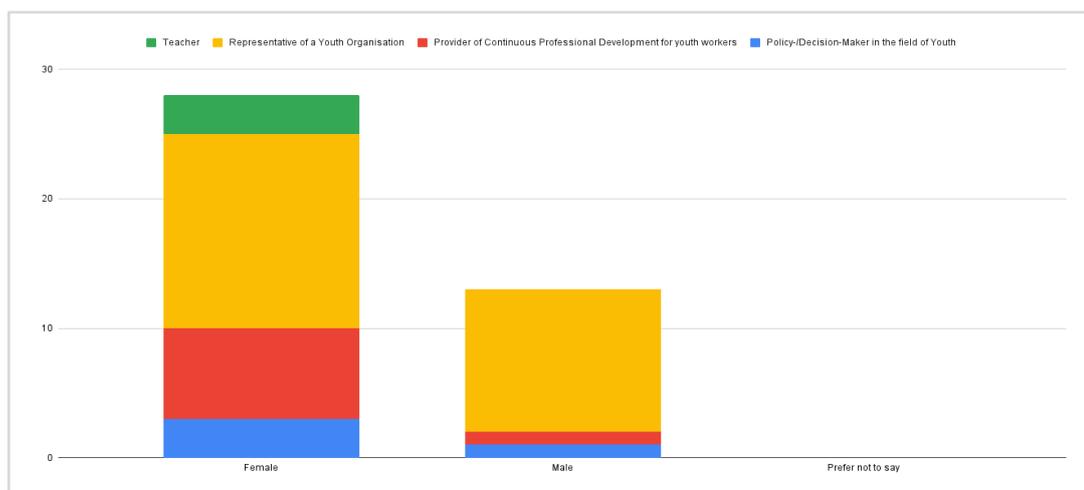


Figure 2. Distribution of participants by profile and gender

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Most participants were between the ages of 26 and 45, with a notable presence of both early-career professionals (less than 5 years of experience in youth work) and more seasoned professionals (10+ years of experience). Participants were recruited through open calls disseminated via professional networks, organisational mailing lists and online communication platforms across the partner countries. The resulting sample was geographically diverse - including participants from Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Greece, Hungary, Italy, Lithuania, Poland, Portugal, Romania, Sweden and Turkey - and reflected a broad range of professional experience and organisational contexts.

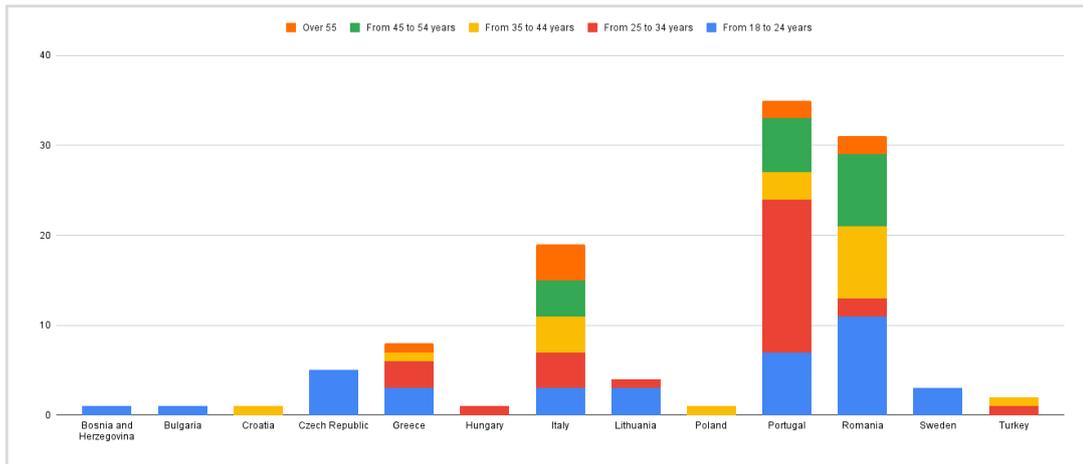


Figure 3. Distribution of participants by age and country

Self-reported data indicate substantial variation in participants' prior familiarity with artificial intelligence. Approximately one third of participants reported having limited or no prior experience with AI-related tools or concepts, while around half described a moderate level of familiarity, often linked to everyday use of digital platforms incorporating AI features. A smaller proportion, less than one fifth of participants, reported advanced awareness or prior experimentation with AI tools in professional or educational contexts.

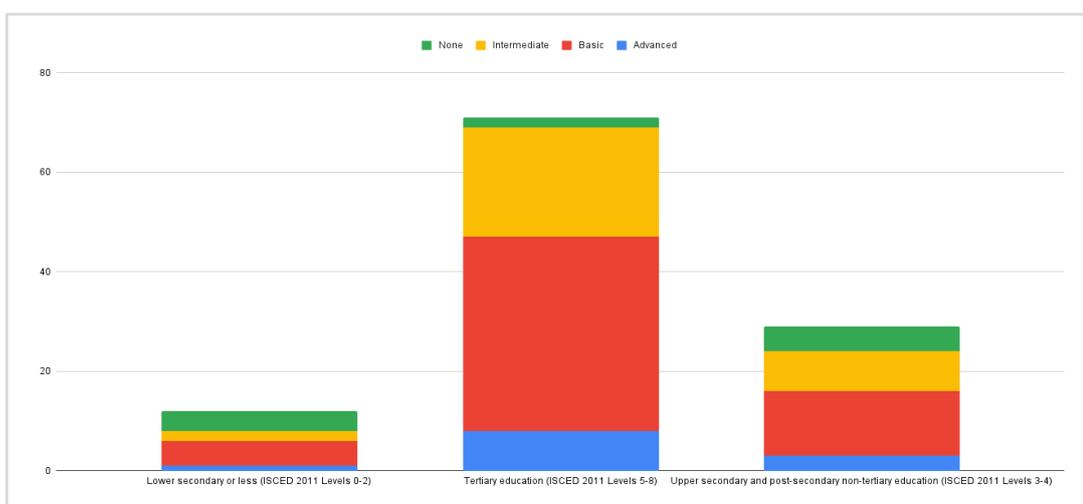


Figure 4. Distribution of participants by educational background and self-reported AI knowledge

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This heterogeneity was considered a strength of the study, as it reflects the diversity of youth work practice and enabled examination of how the training path was perceived across different starting points in terms of AI readiness, professional role and experience. It also allowed the analysis to explore whether the training design was accessible and meaningful for participants with varying levels of prior AI exposure.

3.4 Data collection instruments

Data were collected using two main instruments: an online survey and platform analytics.

An online survey was administered to participants upon completion of their learning experience. The survey included a combination of closed-ended and open-ended items. Closed-ended items were primarily based on Likert-scale questions addressing participants' perceptions of:

- relevance of the training content to their professional role,
- applicability of learning to youth work practice,
- perceived improvement in AI-related knowledge and skills,
- confidence and readiness to engage with AI,
- usability and clarity of the learning materials,
- attention to ethical, accessibility and inclusion-related aspects.

Open-ended questions invited participants to reflect on their overall experience, identify strengths and challenges of the training and provide suggestions for improvement. These responses offered qualitative insights into how participants interpreted the training and which design elements they found most meaningful.

Platform analytics were used to complement self-reported survey data with behavioural indicators of engagement and participation patterns. Analytics data included information on participant registration, module access and completion, time spent on learning activities and completion of learning units.

These data provided contextual information on how participants engaged with the training path and supported the interpretation of survey findings related to engagement and perceived usefulness.

3.5 Data analysis

Data analysis combined descriptive quantitative analysis with qualitative thematic analysis.

Quantitative data from the survey were analysed using descriptive statistics, including frequencies, percentages and mean values. This analysis focused on identifying general trends in participants' perceptions of learning outcomes, relevance and usability. Platform analytics were used to contextualise these findings by providing additional information on participation and engagement patterns.

Qualitative data from open-ended survey responses were analysed using thematic analysis. Responses were coded iteratively to identify recurring themes related to competence development, relevance to practice, design characteristics and ethical or contextual

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considerations. Particular attention was paid to statements illustrating why certain design features were perceived as supportive or challenging.

The analysis was aligned with the research questions. Findings related to perceived AI knowledge, skills and readiness informed Sub-Research Question 1, while themes related to relevance, usability and meaningful design characteristics informed Sub-Research Question 2. Together, these analyses supported an integrated interpretation addressing the Main Research Question.

4. Results

This section presents the findings of the study in relation to the two sub-research questions. Quantitative survey data are used to describe general trends in participants' perceptions, while qualitative feedback is used to illustrate and deepen the interpretation of these trends. Platform analytics are employed as supportive evidence to contextualise engagement and completion patterns.

4.1 Designing an AI training path to address youth workers' competence needs (Sub RQ1)

Findings related to Sub-RQ1 focus on participants' perceived development of AI-related knowledge, skills, confidence, and readiness to engage with AI in youth work practice. These findings are interpreted in light of the heterogeneous participant profiles, which included youth workers with limited, moderate, and more advanced prior familiarity with AI.

Overall, 77% of participants reported perceived improvement in their understanding of AI concepts relevant to youth work. This perceived knowledge development was particularly pronounced among participants who reported limited or no prior exposure to AI, many of whom described the training as helping them "make sense" of AI in relation to their professional role. For these participants, the training appeared to function as an entry point that reduced uncertainty and supported foundational understanding.

Participants with moderate prior familiarity also reported perceived knowledge gains, often emphasising the value of contextualisation. Qualitative feedback from this group suggests that the training helped them connect existing digital practices to broader AI-related concepts, ethical considerations, and youth work values. Participants with more advanced awareness reported comparatively smaller perceived gains in basic knowledge, but highlighted benefits related to reflection, ethical framing, and structured competence development.

Perceived skill development followed a similar pattern. 78% of participants indicated that the training supported the development of skills applicable to youth work practice. For participants with lower initial AI readiness, these skills were often described in terms of increased confidence in experimenting with AI-powered tools and engaging in AI-related discussions with young people. Participants with higher prior familiarity more frequently reported gains related to reflective use, critical assessment, and intentional decision-making regarding AI adoption.

Readiness to engage with AI in future professional practice was also reported at high levels, with 78% of participants indicating a high likelihood of applying AI-related insights or tools in their work. Importantly, readiness was not framed solely as willingness to use AI tools, but as increased confidence in engaging critically and ethically with AI-related issues. This was evident across

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participant profiles, although participants with lower initial familiarity more often described readiness in terms of overcoming hesitation, while those with higher familiarity emphasised more deliberate and responsible engagement.

Platform analytics support these interpretations by showing sustained engagement across competence areas. Participants with lower initial AI familiarity were more likely to engage sequentially with introductory and foundational units, while those with higher familiarity more often selected specific modules aligned with their professional interests. This pattern suggests that the modular design supported differentiated engagement across starting points.

Ultimately, these findings suggest that the training path supported perceived competence development across a heterogeneous group of youth workers, while allowing participants to engage in ways that reflected their prior experience and professional needs.

4.2 Design characteristics that make AI training relevant and meaningful (Sub-RQ2)

Findings related to Sub-RQ2 focus on participants' perceptions of relevance, usability, and meaningfulness of the training design, with particular attention to how these perceptions varied across different participant profiles.

Perceived relevance to professional roles was high overall, with 77% of participants agreeing or strongly agreeing that the training content was relevant to their work. Participants with limited prior AI experience frequently associated relevance with accessibility and clarity, emphasising the importance of non-technical language and concrete youth work examples. For these participants, relevance was closely linked to feeling that the training was “designed for youth workers” rather than for technical specialists.

Participants with moderate to advanced AI familiarity also reported high relevance, but often framed it differently. For this group, relevance was associated with ethical framing, structured competence areas, and the explicit connection between AI use and youth work values. Qualitative responses suggest that these participants valued the opportunity to reflect on AI beyond instrumental use and to situate their practices within a broader professional and ethical framework.

Perceived real-life applicability was particularly strong, with 84% of participants indicating that the learning content could be applied to concrete youth work situations. Participants across all familiarity levels highlighted the usefulness of practice-oriented examples and reflective prompts. However, participants with lower initial AI readiness more often emphasised applicability in terms of starting conversations with young people, while those with higher readiness focused on integrating AI into programme design, facilitation, or evaluation activities.

Usability and structure were consistently identified as enabling factors. Over 80% of participants rated the clarity and organisation of the learning materials positively. Participants with limited prior AI experience highlighted modularity and self-paced progression as critical for reducing cognitive overload and allowing gradual engagement. Participants with higher familiarity valued the ability to selectively access modules aligned with specific competence areas, rather than following a linear pathway.

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Ethical framing emerged as a cross-cutting design characteristic contributing to meaningfulness across participant profiles. Participants with diverse starting points reported that attention to ethics, inclusion, and responsibility strengthened their perception of AI competence as relevant to youth work identity. For some participants, particularly those with lower initial familiarity, ethical framing also functioned as a legitimising factor, reinforcing the idea that engaging with AI is compatible with youth work values.

Overall, the findings suggest that the perceived relevance and meaningfulness of the training design were shaped not by participants' technical expertise, but by how well the training accommodated diverse starting points, connected AI to professional practice, and foregrounded ethical and contextual considerations.

5. Discussion

This section interprets the findings in relation to the study's research questions and situates them within the broader context of AI competence development in non-formal education. The discussion focuses on what the results suggest about how AI training paths for youth workers can be designed to support critical, ethical and practical engagement with AI.

5.1 Implications for designing AI training paths for youth workers (Sub-RQ1)

The findings related to Sub-RQ1 suggest that AI training paths can support youth workers' competence development when they are designed to accommodate heterogeneous starting points and professional roles. Participants entered the training with varying levels of AI familiarity, ranging from limited prior exposure to more advanced awareness. The reported patterns of perceived competence development indicate that a single, uniform training approach would likely have been insufficient to meet these diverse needs.

For participants with limited prior experience, the training path appeared to function primarily as a scaffold for foundational understanding and confidence-building. Improvements in perceived knowledge and readiness among this group suggest that design elements such as introductory content, clear language, and progressive engagement were particularly important. These findings align with the notion that early-stage AI competence development in youth work requires reducing intimidation and uncertainty.

Participants with moderate levels of prior familiarity reported competence development of a different nature. For this group, the training appeared to support sense-making and integration, helping them connect existing digital practices to broader AI-related concepts, ethical considerations, and youth work values. This suggests that AI training paths should not only introduce new content, but also create space for reflection and re-framing of existing practices.

Participants with higher levels of prior AI awareness reported more selective forms of competence development, emphasising gains related to ethical reflection, critical judgement, and structured competence orientation. For these participants, the value of the training lay less in basic knowledge acquisition and more in the articulation of AI competence as a professional capacity embedded in youth work roles and responsibilities.

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These findings suggest that AI training paths for youth workers should be designed as progressive and modular learning experiences that support different forms of competence development depending on participants' starting points, thus supporting foundational understanding, reflective integration and ethical judgement as complementary dimensions of competence.

5.2 What makes AI training relevant to youth workers' professional needs (Sub-RQ2)

The findings related to Sub-RQ2 highlight that relevance in AI training is interpreted differently across participant profiles, but consistently grounded in contextual and value-based considerations. Participants did not primarily associate relevance with exposure to specific AI tools or advanced functionalities. Instead, relevance was closely linked to how well the training reflected youth work realities and supported participants' professional identities.

For participants with limited prior AI familiarity, relevance was strongly associated with accessibility, clarity, and the explicit connection to youth work contexts. The use of non-technical language, practical examples, and modular learning units appeared to reduce barriers to engagement and support initial participation. In this sense, relevance functioned as an enabling condition that allowed these participants to see AI as a legitimate and approachable topic within youth work.

Participants with moderate to advanced familiarity framed relevance in terms of ethical framing and structured competence areas. For these participants, the training was perceived as meaningful because it positioned AI competence within a coherent professional framework rather than as a collection of isolated tools. This finding underscores that relevance in professional learning is not only about immediate applicability, but also about alignment with professional values and responsibilities.

Across all participant profiles, ethical and critical engagement emerged as a central factor shaping perceived relevance. The explicit integration of ethics, inclusion, and responsibility resonated with youth work values and supported participants in reconciling AI engagement with their professional ethos. This suggests that ethical framing is not an optional or advanced component of AI training for youth workers, but a core design element that enhances relevance and legitimacy.

Usability and flexibility further contributed to relevance by enabling differentiated engagement. Participants with varying time constraints and professional responsibilities valued the ability to engage selectively with learning units aligned with their needs. This finding reinforces the importance of modular and self-paced design in non-formal professional learning contexts.

5.3 Answering the main research question

The Main Research Question asked how youth workers can be effectively equipped with AI competences to engage critically, ethically, and practically with AI in youth work contexts. Taken together, the findings related to Sub-RQ1 and Sub-RQ2 suggest that youth workers can be equipped with AI competences when training paths are designed to accommodate diverse starting points, support progressive and reflective competence development, and foreground ethical and contextual considerations.

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Based on the synthesis of the results and discussion, the findings suggest a set of interrelated design principles that appear to underpin AI training paths perceived by participants as relevant, usable, and supportive of competence development in non-formal youth work contexts.

a. Modular and flexible structure: The findings suggest that AI training paths perceived as meaningful by participants were characterised by modular learning units that allowed selective and non-linear engagement. Such structures appeared to support heterogeneous starting points and to accommodate the varied time constraints and professional responsibilities reported by youth workers.

b. Contextual relevance to youth work practice: Participants' perceptions indicate that AI-related learning was experienced as more relevant when content was explicitly grounded in youth work roles, practices, and everyday professional situations. The findings suggest that contextualisation, rather than technical sophistication, played a central role in shaping perceived usefulness.

c. Ethical and value-based grounding: The findings indicate that the integration of ethical considerations, inclusion, and responsibility across competence areas contributed to participants' perception of legitimacy and relevance. Rather than being treated as a separate topic, ethical framing appeared to support alignment between AI competence development and core youth work values.

d. Progressive complexity and reflective engagement: The results suggest that participants with different levels of prior AI familiarity perceived value in different aspects of the training. This points to the importance of training designs that support progression from foundational understanding towards more reflective and critical engagement, without assuming a uniform or linear trajectory of competence development.

Together, these design principles provide an empirically grounded response to the Main Research Question. They suggest that youth workers' AI competence development is closely linked to how training paths are structured, contextualised and framed. From this perspective, AI training for youth workers can be understood as most meaningful when it supports professional agency, reflection and responsible engagement with AI, in ways that are consistent with non-formal education principles and youth work identities.

6. Limitations and Future research

This study has several limitations that should be considered when interpreting the findings. First, the research was conducted as a pilot study, which necessarily limits the scope and generalisability of the results. The primary aim was exploratory and formative, focusing on generating design-oriented insights rather than establishing causal relationships or long-term outcomes.

Second, the study relies predominantly on self-reported data. Participants' perceptions of competence development, relevance and readiness to engage with AI provide valuable insights into their learning experience, but they do not constitute objective measures of competence acquisition or behavioural change. Future research could complement self-reported data with

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observational methods, performance-based assessments or analysis of practice-based artefacts produced by participants.

Third, the evaluation captured participants' experiences over a relatively short time frame. As AI competence development is an ongoing and dynamic process, the study does not provide evidence of sustained impact or long-term integration of AI into youth work practice. Further research would be necessary to explore how training experiences influence professional practice over time and how youth workers' engagement with AI evolves.

Finally, while the participant group was heterogeneous, the study does not allow for systematic comparison across different national, organisational or professional contexts. Comparative studies could provide deeper insights into how contextual factors shape AI competence development and training relevance in youth work.

Future research could build on the findings by examining AI training paths in different non-formal education settings, comparing alternative design approaches, or conducting in-depth qualitative studies that explore how youth workers translate AI-related learning into practice. Such research would further strengthen the evidence base for designing AI competence development initiatives in the youth work field.

7. Conclusions

This study set out to explore how youth workers can be effectively equipped with AI competences to engage critically, ethically and practically with AI in youth work contexts. By focusing on a pilot AI training initiative and examining participants' perceptions and experiences, the study aimed to contribute knowledge to the emerging field of AI competence development in non-formal education.

The findings suggest that AI competence development for youth workers is more effective when new knowledge, skills, and attitudes are integrated with learners' prior experiences, and when learners clearly perceive that the use of digital and AI-based technologies enhances their capacities to make decisions, solve problems, and interpret everyday contexts. The design of learning experiences plays a crucial role in achieving this integration. Training experiences that are progressive, practice-oriented, and ethically grounded appear to strengthen youth workers' sense of confidence, readiness, and professional relevance. Rather than positioning AI competence as a technical specialisation, the study highlights the importance of framing engagement with AI as an integral component of youth work practice and its underlying values.

A key contribution of the study lies in foregrounding training design as a central mechanism for equipping youth workers with AI competences. The results indicate that relevance, usability and meaningfulness are shaped by contextualisation, ethical framing, clarity of language and flexibility of learning pathways. These design characteristics support engagement across diverse levels of prior experience and help align AI competence development with the realities of non-formal education.

The study provides empirically informed insights that can inform future AI training initiatives for youth workers and related professionals. The design principles identified may also be transferable

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to other non-formal and adult education contexts where educators are expected to engage with AI in ways that are critical, ethical and socially responsible.

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