Generative AI and Professional Development Design. Integrated learning support for educators using AI

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Abstract
As generative artificial intelligence (GenAI) becomes increasingly embedded in educational practice, the need for robust, ethically grounded professional development (PD) for educators is critical. This paper presents preliminary findings from the Frontline Application of Artificial Intelligence and Technology-enhanced Learning in Higher Education (FAITH) project, a design-based research (DBR) project focused on developing and delivering AI-related PD.
The literature review highlights the transformative impact of AI across educational systems and identifies key challenges, including academic integrity, diminished creativity, and the need for contextual adaptation. The FAITH project responds to these challenges through a transatlantic collaboration between Mid Sweden University and Athabasca University, resulting in the co-design and implementation of graduate-level, credit-bearing PD courses on AI in education. Part of this project tests Community of Inquiry (CoI) principles to foster reflective inquiry, ethical deliberation, and practical skill development in reference to AI.
Broad outcomes of the FAITH project include the successful development of a modular PD curriculum that combines theoretical foundations with hands-on exploration of GenAI tools. Educators engaged in synchronous and asynchronous learning activities, case-based tasks, and collaborative reflections. Participants reported increased confidence in evaluating AI-generated content, designing AI-informed assessments, and facilitating student discussions on the ethical use of AI. The project also established a strategic framework for aligning PD with institutional goals for digital transformation and pedagogical renewal.
The discussion emphasizes CoI's value not only as a pedagogical model but also as a moral compass for navigating the ethical complexities of AI in education. Acknowledging the challenges and possibilities related to educators' use of AI, PD is important. Providing educators PD in understanding and describing the history and development of AI, possibilities and challenges related to the use of AI as a tool in educational context, as well as reflecting how GenAI can affect the design of learning activities, assessment and examination will be necessary. By promoting inclusive dialogue and intentional design, CoI ensures that AI supports the deeper goals of education: to enlighten, connect, and empower learners. In conclusion, the FAITH project demonstrates that CoI-based PD offers a sustainable, scalable, and ethically grounded approach to preparing educators for the evolving landscape of AI in education.

Keywords
Artificial intelligence in education, AIED, Teacher Professional Development, Community of Inquiry

Introduction

The *Frontline Application of Artificial Intelligence and Technology-enhanced Learning in Higher Education* (FAITH) project was initiated as a professional and organisational development initiative at the Department of Education, Mid Sweden University. Later, it included collaboration with Athabasca University in Canada. The project was strategically designed to address the growing need for professional development (PD) that supports educators in engaging meaningfully with Artificial Intelligence (AI) in higher education. As such, FAITH represents both a local institutional project and a transatlantic collaboration aimed at strengthening competence, organisational readiness, and critical awareness concerning AI in education. Even if FAITH also includes the development of courses and programmes by educators run by the collaborating universities, this paper focuses on PD courses centred on AI in Education.

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As described by Mollick (2024), the rapid development of Generative artificial intelligence (GenAI) has a jagged frontier where GenAI sometimes excels in complex tasks, while still failing in what easily can be solved by humans. To introduce and discuss this jagged frontier is crucial for the development of AI literacy. In some fields such as medicine GenAI has contributed beyond expectation, while in other fields there are doubts about the return on investment. Regarding artificial intelligence in education (AIED), the financial success of GenAI will not play a decisive role, the new tools are frequently used with their opportunities and challenges. There have been several research studies reporting on students' misuse of GenAI and the need for revising the current assessment model (Ventayen, 2023; Goya et al., 2025). To prevent misuse and to take advantage of the opportunities of GenAI, teacher PD is crucial (Tan, 2025).

The application of three pedagogical elements which support the Community of Inquiry (CoI) framework are cognitive presence, social presence, and teaching presence (Cleveland-Innes, 2019). Cognitive presence provides the opportunity for critical reflection, deliberative inquiry, and context-relevant application of knowledge. This alone allows learners to consider responsible decision-making regarding the use and potential misuse of AI in education and society. Social and teaching presence encourages learners to connect and learn from others and collaboratively direct course activities. These additional developments reinforce the needs for human interaction while learning where and how AI may add to these important learning processes.

Literature Review

Current views about higher education transformation requirements after the emergence of AI are now in focus. Advancements in AI have had a direct influence on all levels of education (Tyson & Sauers, 2021), as these systems have, and will continue to be, impacted by AI (Karakose & Tülübas, 2024). The use of AI has shifted towards how AI tools can reflectively, critically and effectively be adopted, used and advanced for teaching, learning, and leadership (Strzelecki, 2023). Although AI can serve as a teaching and learning tool to stimulate reflection, create ideas, assist in assessments, and correct language, there are also challenges. There are risks such as a lack of control, cheating, decreased creativity, and the advance of academic dishonesty (Neumann et al, 2023). Educators may need PD to instruct students on academic integrity, how to critically evaluate any resources, and how to adapt the use of AI in education to their specific context (Rudolph et al, 2023). Expertise, experience, and understanding students' use and the opportunities and constraints that the use of AI encompasses will be important (Cooper, 2023) as well as improving administration and PD for educators (Hutami, 2024). Two frequently studied themes in AIED research research have been to analyse and discuss the opportunities and challenges of involving AI in education (Jafari & Keykha, 2024), and to argue for the need for educators' PD in AI and AIED (Brandão et al., 2024). This PD process should preferably be conducted with frequent use of AI to explore and discuss the jagged frontier of GenAI and to analyse the need for rethinking the current assessment design (Furze et al., 2024; Mozelius, 2025). Considering the large number of educators and the fact that GenAI is a moving target, this seems like a resource-intensive process of life-long learning.

The Community of Inquiry (CoI) framework, developed by Garrison, Anderson, and Archer (2000), outlines a theoretical process for designing and delivering online and blended learning environments. The interplay of three core elements: cognitive presence, social presence, and teaching presence offer a collaborative experience of socially-shared meta-cognitive opportunities. According to empirical studies, this CoI experience leads to deep, meaningful learning (Akyol & Garrison, 2011; Garrison & Cleveland-Innes, 2005). As AI, particularly GenAI, becomes increasingly embedded in educational contexts, a CoI process for PD will allow educators to critically explore AI's compatibility with and impact on the learners in their context.

Case Description

The FAITH project is grounded in a design-based research (DBR) methodology (Jaldemark, Lindqvist, & Mozelius, 2019), which emphasises iterative and evidence-informed processes combining research, development, and practice. The project was structured in three interrelated phases—preparation, implementation, and evaluation—each contributing to a cumulative and reflexive development cycle. The preparation phase focused on establishing the strategic and operational foundations of the project. A steering group was established to define the project's aims, identifying relevant competence areas, and aligning the PD framework with institutional strategies for digitalisation and pedagogical renewal. One of the outcomes was the design of credit-bearing professional development courses on AI in education, collaboratively developed by Mid Sweden University and Athabasca University. The course curriculum was informed by both theoretical perspectives and emerging

practices in AI and TEL, ensuring academic rigour and practical relevance. The implementation phase centred on the delivery of the transatlantic PD course. The course was designed for educators and educational developers seeking to explore the pedagogical and organisational implications of AI. It combined asynchronous and synchronous learning activities, case-based and problem-oriented tasks, and collaborative reflections.

The FAITH course design at Athabasca University involves graduate-level, credit course provides the following overview: "Education spans many sectors: K-12, higher education, lifelong learning, and workplace development. It touches all other areas of study that are also steeped in AI research and study. Broad and appropriate education support and application across fields and disciplines is required. "AI in education refers to the use of artificial intelligence technologies, such as machine learning and natural language processing, to enhance the learning experience" (Harry, 2023, p. 261). The course will present, discuss, and apply basic theories and tools in artificial intelligence for education and learning, in support of the following learning objectives gained in a CoI activity framework. After completing the course, the learners will be able to: Understand and describe the history and development of artificial intelligence (AI); Analyze and discuss challenges and opportunities with AI in educational contexts; Describe and apply different modalities such as text, image, and sound in Generative AI; Compare, discuss, and reflect on how generative AI can affect and change learning activities and assessment in various courses.
Teaching Presence is the pedagogically critical CoI element for AI Professional Development. It is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p.5). It refers to all members of the course community, hence the name Teach**ing** and not Teach**er** Presence. Teaching Presence gives permission and support for all views on AI and its challenges and opportunities. As course participants are in the role of novice AI users, experiences and early states of understanding are safely shared and reviewed.
Networked learning depends on the development of loosely coupled connections. These connections often begin as temporary or incidental, but they deepen over time and create a natural momentum to continue interacting. The Community of Inquiry (CoI) framework supports this process by emphasizing three key dimensions of online engagement: social presence, cognitive presence, and teaching presence. Together, these elements help learners develop a sense of *knowing* one another, which is essential for meaningful collaboration. This framework is especially valuable in distant, distributed, and virtual networks, as well as mixed environments that blend in-person and online engagement. In such contexts, the CoI helps establish a sense of community within otherwise diffuse networks, sustains participation, enables deeper inquiry and shared knowledge construction, reduces isolation, and brings coherence and purpose to learning networks. This is particularly important for educators worldwide as they navigate emerging developments in AI. As the knowledge base evolves, understanding the perspectives of many others becomes essential for making informed, responsible decisions.

Method

The overall goal of this design-based research (DBR) is to propose evidence-based implementation approaches for AI professional development. The DBR method is an offshoot of action research focused on teaching and learning design created by and for educators (Anderson & Shatttuck, 2012). The findings drawn from DBR seeks evidence of impact, transfer, and translation of education research into improved practice. According to Anderson & Shattuck, "it stresses the need for theory building and development of design principles that guide, inform, and improve both practice and research in educational contexts" (p. 2).
This segment of the research examines constructivist-collaboration approaches to AI PD via community of inquiry learning activities.
Data collection was requested from students enrolled in a fully online Master of Education program taking the FAITH course at the graduate level. Text-based information from students is drawn from: Pre-course surveys; weekly discussion posts; essay assignment submissions; implementation project description submissions, and critical reflection assignment submissions. Data analysis applies a grounded theory approach to allow description, coding, definition, and synthesis of data. Results will be fashioned into conceptual relationships.

Preliminary results

Courses and data collection are ongoing. Findings are emerging and new results will be offered at the June 2026 Symposium presentation. Data from critical reflections about this CoI-based course ***AI for Educators*** is under

review from the two completed of three sections to be offered. Current analysis demonstrates evidence of impact, transfer, and translation of AI information into professional choices about AI use and nonuse. Course participants are educators from multiple professional occupations: higher education, K-12 education, law, nursing, paramedicine, and pharmacy. A pre-course survey provided evidence of the full range of new approaches to AI: fear, caution, and excitement. Post course reflections acknowledge: Awareness of the history and development of AI; Increased understanding of the range of AI types; Expanded interest in AI research, training, and policy; A range of interest in testing AI tool; and Commitment to further PD about AI. The post course reflection paint a picture of a deeper, wider and more reflective understanding of AI and PD which expands and advance the initial approaches.

Discussion

This paper explored the FAITH project which was initiated as a professional and organisational development initiative. The project was strategically designed to address the growing need for PE that supports educators in engaging meaningfully with AI in higher education. Acknowledging the challenges and possibilities related to educators' use of AI, PD is important. Providing educators PD in understanding and describing the history and development of AI, possibilities and challenges related to the use of AI as a tool in educational context, as well as reflecting how GenAI can affect the design of learning activities, assessment and examination will be necessary. The Community of Inquiry framework offers more than a pedagogical model for AIED. It provides a moral and intellectual foundation for navigating the ethical complexities of AI in education. By fostering critical thinking, inclusive dialogue, and intentional collaborative design, CoI ensures that AI serves the deeper goals of education: to enlighten, connect, and empower. As AI continues to evolve, the CoI framework remains a vital tool for educators committed to learning about and using AI toward ethical innovation and transformative development.

Conclusion

This paper presents preliminary insights from a design-based research and practice project focused on AI professional development for educators. Drawing on the FAITH project's design and observations, we provide arguments for and against Community of Inquiry (CoI)-based learning environments to support critical decisions about AI use. The design of teacher professional development plays a critical role in determining the effectiveness of AIED implementation across diverse educational contexts and organizations. As generative AI becomes increasingly embedded in educational practice, the authors recommend leveraging the inherent strengths of the CoI framework to guide the design and delivery of AIED initiatives.

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