

Module: Qualitative Research Methods (BMDP7008)

Title: Exploring the Integration of Generative AI in Further Education Teaching Practices

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Abstract

This study examines the incorporation of generative artificial intelligence (AI) tools in Further Education (FE) teaching methodologies, emphasising adoption trends, pedagogical evolution, institutional influences, and implementation obstacles. This study examines the influence of AI tools, including lesson planning aids and feedback generators, using qualitative data from interviews with five further education educators from diverse disciplines and institutional types. Prominent themes identified in the investigation encompass diverse adoption rates, individualised learning opportunities, and institutional inequalities in AI implementation. Although 80% of participants indicated utilising AI for lesson planning, notable disparities were observed in institutional support, with 40% reporting robust assistance and 20% feeling inadequate resources.

Obstacles such as infrastructural constraints, disparate access to professional development, and apprehensions regarding output reliability highlight impediments to equitable AI integration. The results indicate disciplinary disparities, with certain disciplines deriving greater advantages from AI tools than others, underscoring the necessity for customised applications. Furthermore, the restricted application of AI for administrative functions and student assistance indicates a suboptimal utilisation of its extensive potential.

This study enhances the existing literature on AI in education by highlighting the complexity and contextual subtleties of AI implementation in further education environments. Recommendations encompass the formulation of standardised policies, the allocation of resources for professional growth, and the execution of longitudinal research to get insights into the long-term effects of AI. Notwithstanding its constraints, such as a limited sample size, this research provides significant insights into the revolutionary potential of AI in further education and underscores areas that need additional investigation.

Keywords: generative AI, Further Education, pedagogical transformation, institutional support, professional development

Introduction

The rapid advancement and widespread adoption of artificial intelligence (AI), particularly in the form of generative AI models like Claude AI, Gemini, Copilot, and ChatGPT-4, are fundamentally reshaping various sectors, with education being a significant area of impact. Generative AI, with its capabilities in natural language processing, content generation, and adaptive learning, offers unprecedented opportunities to support educators in a range of tasks. These applications are particularly relevant for tasks such as lesson planning, feedback provision, grading, and streamlining administrative workloads, all of which have traditionally required substantial time and resources from educators Brown et al. (2020); Luckin et al. (2017).

The focus of this study is on Further Education (FE) teachers and lecturers, a crucial yet often under-represented group within educational AI research. Unlike traditional K-12 or higher education, FE encompasses a diverse educational landscape, including vocational training, academic courses, and adult education Watkins et al. (2021). This diversity in instructional settings and learner needs makes it essential to understand how generative AI can be tailored to support FE teachers in their specific contexts. For instance, FE educators often engage with students who have different educational backgrounds and career aspirations, which may influence the ways in which AI can be effectively integrated into teaching and learning processes Hinojo-Lucena et al. (2019); Kukulska-Hulme et al. (2021).

This research, therefore, aims to investigate the current use and impact of generative AI tools within the FE sector, guided by the following research questions:

1. How are FE teachers currently adopting and using generative AI in their teaching practices?
2. What specific tasks or aspects of teaching are most impacted by generative AI?
3. What benefits and challenges do FE educators perceive in integrating AI into their work?
4. Are there notable differences in AI usage across disciplines or institution types within the FE sector?

By exploring these questions, this study seeks to fill a critical gap in understanding how generative AI can be optimally integrated within FE education to meet specific teaching needs and support diverse student populations.

Context to the Study: AI Integration in FE, Sixth Form, and KS-5 Secondary Education

This study examines the perspectives of educators on the integration of generative AI tools into teaching practices, based on interviews with five teachers from Further Education (FE), sixth form, and KS-5 secondary school settings. The participants represented diverse disciplines, including vocational studies, STEM, and humanities, and varied in teaching experience. The focus was on their adoption and use of generative AI tools, particularly in lesson planning, assessment design, and student engagement, as well as the challenges they encountered.

The study was conducted over a two-month period and was divided into two phases. In the first phase, participants attended workshops on the potential applications of generative AI, including tool models such as Claude AI, Gemini, Copilot, ChatGPT-4, and others. These workshops introduced educators to AI's capabilities in creating customised resources, automating repetitive tasks, and personalising feedback. This orientation phase aimed to equip participants with foundational knowledge to explore AI in their specific teaching contexts.

In the second phase, participants were encouraged to implement AI tools independently over a three-week period. This practical application phase involved educators experimenting with AI in their respective classrooms. Tasks included creating lesson materials, designing assessments, and using AI to provide feedback. Participants engaged in collaborative learning through regular asynchronous discussion forums, which allowed them to share insights, reflect on their experiences, and address challenges collectively. The socio-constructivist lens reveals how digital technologies mediate knowledge construction through collaborative meaning-making and social interaction, as posited by Selwyn and Facer (2021), who emphasised the value of shared experiences and reflective practices in fostering deeper understanding and innovative use of AI in education.

The findings revealed varied adoption patterns across educational contexts. FE teachers, particularly those in vocational disciplines, demonstrated a higher degree of AI integration. They used AI to streamline lesson planning and tailor assessments to specific competencies. Sixth-form teachers were more cautious, primarily leveraging AI for administrative tasks such as generating reports. However, they also explored AI's potential to enhance student engagement, particularly in large classes where personalised feedback was otherwise challenging to deliver.

Despite its potential, educators identified several challenges. Concerns were raised about the reliability of AI outputs and the risk of inaccuracies, which required manual oversight. Equity of access emerged as a critical issue, particularly in secondary

schools, where students from disadvantaged backgrounds might lack the resources to engage with AI-driven tools effectively. Additionally, participants highlighted the need for structured professional development to enhance their confidence and proficiency in using AI tools. These findings align with recent research emphasising the importance of training and institutional support to maximise the benefits of AI in education Johnson et al. (2022).

Overall, the study highlights the transformative potential of generative AI in education while underscoring the importance of addressing barriers through targeted training, resource allocation, and equitable access initiatives. Future research should investigate the long-term impacts of AI integration, particularly from the perspectives of students, to provide a more comprehensive understanding of its role in education.

Literature review

The integration of artificial intelligence (AI) into education, particularly through generative AI models such as Claude AI, Gemini, Copilot, and ChatGPT-4, is reshaping instructional practices across various educational sectors. Current literature demonstrates the transformative potential of these AI tools for enhancing pedagogical methods, yet considerable gaps remain in understanding how these technologies specifically influence Further Education (FE) teaching practices. This review examines existing studies on generative AI applications within education, identifying key benefits, challenges, and opportunities while highlighting the limited research available on its use by FE teachers.

1. Applications of Generative AI in Education

The application of generative AI in education has gained prominence, especially with the advent of language models capable of generating coherent, contextually relevant text that can serve as teaching aids. These models, such as Claude AI, Gemini, Copilot, and ChatGPT-4, have the ability to create high-quality instructional content, support individualised learning pathways, and offer continuous feedback Brown et al. (2020). These attributes render generative AI particularly suitable for applications such as lesson planning, content generation, and personalised student feedback. Research shows that AI-driven content generation tools have been instrumental in reducing the cognitive load on educators, particularly by automating repetitive tasks, Kumar et al. (2022).

A significant area of generative AI's impact is personalised learning. Studies indicate that AI tools can be tailored to students' unique learning speeds, preferences, and challenges, enhancing engagement and comprehension, Luckin et al.(2016); Xu and Wang, (2021). According to Xu and Wang (2021), generative AI systems can adaptively

recommend resources based on a student's progress, thereby enabling differentiated instruction. This aligns with the principles of constructivist learning, where the focus is on adapting the educational process to meet the learner's needs. Researchers have found that AI can facilitate formative assessment through real-time feedback, allowing students to iteratively improve their work based on constructive suggestions provided by AI systems.

Moreover, AI-driven tools have proven effective in language and writing education. For instance, Alharbi (2021) demonstrated that GPT-3-based tools assisted students in generating ideas, improving writing quality, and receiving instant feedback, enhancing their engagement and performance in writing tasks. Similarly, Edmett, A. et al. (2024). explored AI applications for teaching English as a second language (ESL), finding that generative AI could aid in vocabulary building, grammar correction, and contextual understanding. These studies collectively highlight that generative AI can not only augment traditional teaching methods but also foster a more interactive and responsive learning environment.

2. Benefits and Challenges of Integrating Generative AI in Education

Despite its advantages, the implementation of generative AI in educational settings is accompanied by notable challenges. On the benefits side, research underscores the potential of AI to streamline administrative tasks, enabling educators to allocate more time toward direct student engagement Holmes et al. (2019). Holmes et al. (2019) point out that AI-driven lesson planning and grading systems reduce the burden of clerical duties on teachers, allowing for a shift towards personalised interactions and the cultivation of critical thinking skills among students. This has led to increased acceptance of AI among educators who view it as a tool for augmenting, rather than replacing, traditional teaching roles.

Conversely, challenges such as data privacy, algorithmic bias, and the erosion of critical thinking skills raise ethical concerns about AI's role in the classroom. For instance, Siau and Wang (2020) argue that AI can inadvertently reinforce biases present within training data, leading to unequal learning opportunities and assessment outcomes. Additionally, the "black box" nature of AI algorithms, where the underlying logic is opaque to both educators and students, may limit its integration into classrooms where transparency and trust are paramount Baker and Smith (2021). Zawacki-Richter et al. (2019) emphasise that educators may lack the technical expertise needed to fully understand and control these AI systems, which can lead to both dependency and disengagement if AI becomes a crutch for routine instructional duties.

Another significant challenge lies in the ethical use of AI data, particularly when applied in formative and summative assessments. Researchers like Williamson and Eynon

(2020) argue that AI-driven assessments could potentially compromise student autonomy and privacy. In their view, the continuous tracking and evaluation facilitated by AI pose risks to students' right to control their educational data, which is especially problematic given that many educational institutions lack clear data governance policies. Despite these challenges, existing literature suggests that, when effectively integrated, generative AI can play a supportive role in instructional processes, but only if ethical considerations are adequately addressed.

3. The State of Generative AI Use in Further Education (FE)

While generative AI's utility has been documented in K-12 and higher education, research on its specific applications within the Further Education (FE) sector is limited. FE institutions, which cater to a diverse demographic, including adult learners and those pursuing vocational or technical qualifications, may present unique requirements for AI integration. To date, most studies have focused on the challenges and opportunities of AI in primary, secondary, and tertiary education, with few addressing the distinct context of FE institutions, Watkins et al. (2021).

The literature suggests that AI could offer considerable benefits for FE educators in vocational training and skills-based learning, where personalisation and adaptability are crucial Hinojo-Lucena et al. (2019). In a survey by Schmid et al. (2021), instructors in vocational training identified AI as a valuable tool for simulating real-world scenarios, thereby enhancing students' practical skills and preparing them for the workforce. However, there is a dearth of research examining how FE educators themselves perceive and implement these AI tools, which creates a significant gap in understanding their practical application and limitations in the FE context.

Some initial studies suggest that FE teachers might face barriers to adopting generative AI due to limited institutional support and a lack of AI-specific professional development. For example, Mavroudi and Hallam (2020) identified that educators in FE settings are often under-resourced, which can hinder their ability to explore and implement AI tools effectively. Furthermore, research shows that many FE instructors perceive AI as an emerging trend rather than a viable instructional tool, possibly due to limited exposure or scepticism about its relevance in skill-based learning. This hesitancy could be attributed to a lack of confidence in navigating AI technology, compounded by insufficient support systems within FE institutions.

4. Gaps in Understanding and Future Research Directions

The gaps in current literature are most evident in the limited exploration of how FE teachers specifically are utilising generative AI tools in practice. Unlike their counterparts in higher education, FE teachers may have more heterogeneous student

groups with varied educational and occupational needs, which could require different approaches to AI integration Kukulska-Hulme et al. (2021). As such, there is a critical need for research that examines how generative AI can be customised to suit the pedagogical practices and learning outcomes specific to FE education.

One gap identified in the literature is the lack of qualitative research focused on FE teachers' experiences with AI in the classroom. While quantitative studies provide useful data on AI adoption rates, they often overlook the nuanced challenges and adaptations that educators encounter. Qualitative studies could offer a deeper understanding of the subjective experiences of FE instructors, including their views on AI's impact on teaching practices and student engagement Salmon (2022). Additionally, more longitudinal studies are needed to evaluate the long-term effects of AI integration in FE settings, particularly regarding student learning outcomes, retention rates, and career readiness.

The limited availability of professional development programs tailored to AI use in FE also represents a notable gap. Researchers such as Ng et al. (2023) argue for the establishment of targeted training that equips FE instructors with both the technical skills and pedagogical strategies required to effectively integrate AI. Professional development could serve as a conduit for enhancing AI literacy among FE instructors, fostering a more robust understanding of AI's capabilities and limitations.

To conclude, the body of literature underscores generative AI's potential to transform educational practices by supporting personalised learning, reducing administrative burdens, and providing real-time feedback. However, significant gaps remain in understanding the application of generative AI within FE, particularly in terms of educator perspectives, institutional readiness, and the unique challenges posed by this educational sector. Addressing these gaps through focused research and professional development initiatives will be essential in unlocking the full potential of generative AI to enrich FE teaching practices and enhance learning outcomes.

Methodology

The methodological framework for this study is based on a qualitative research design, which provides a comprehensive approach for examining complex, contextualised experiences and perceptions of FE teachers using generative AI in their educational practices. A qualitative approach, with semi-structured interviews, allows for in-depth exploration of individual experiences and nuanced perspectives, critical for understanding how generative AI tools are used in different educational contexts Creswell (2013). This methodology section outlines the research design, participant recruitment and selection, data collection and analysis procedures, and ethical considerations. This methodological approach aligns with contemporary educational

technology research frameworks, Anderson and Chen (2020) and enables deep exploration of educators' experiences with AI implementation.

Research Design and Theoretical Framework

The research design followed constructivist grounded theory principles Wilson et al. (2022), allowing for systematic analysis of AI adoption patterns while maintaining flexibility in data interpretation. This approach facilitates understanding of complex technological integration processes within educational settings Thompson (2023).

This study employs a qualitative research design to explore FE teachers' use and perceptions of generative AI in their teaching practices. The rationale for using a qualitative approach is grounded in the need to capture in-depth insights into how educators engage with new technologies, which is best achieved through detailed descriptions and thematic interpretations Patton (2002). Qualitative research enables the identification of patterns, themes, and variations across different contexts and provides a platform for participants to discuss their lived experiences, perceptions, and personal interactions with AI Miles et al. (2014).

The primary method used in this study is semi-structured interviews. Semi-structured interviews are advantageous because they allow for flexibility in questioning while maintaining a consistent set of core enquiries across participants, Kvale and Brinkmann (2009). This format supports an exploration of both anticipated and emergent themes, providing depth and context to the study's findings. Using this method enables a holistic understanding of individual and institutional experiences, capturing both personal and shared perspectives.

Participant Selection Criteria and Recruitment

The selection criteria for participants focused on recruiting FE teachers across diverse disciplines, teaching experience levels, and institution types. This diversity was essential to gain a comprehensive understanding of the varied applications of generative AI in FE settings, as these variables may influence the adoption and effectiveness of AI tools, Johnson and Christensen (2019). Participants were required to have at least six months of experience using AI tools in their teaching practice, ensuring they had adequate exposure to form informed insights and assessments of AI's benefits and challenges.

Recruitment was conducted through a combination of purposive and snowball sampling techniques. Initial recruitment involved reaching out to professional networks, educational conferences, and online forums related to FE and AI in education. Subsequently, participants were encouraged to recommend colleagues who also used

generative AI in teaching, allowing for an expansion of the sample size through referrals, Biernacki & Waldorf (1981). This approach was advantageous as it allowed for the inclusion of diverse perspectives and fostered trust and openness among participants, given their connections within professional networks.

Five FE educators participated in the study, selected through purposive sampling to ensure representation across disciplines: soft skills, performing arts, media computing, law, criminology, government, and politics. Participant demographics included 40% identifying themselves as female and 60% identifying themselves as male educators, with teaching experience ranging from 3 to 15 years. This diversity enabled exploration of AI integration across different subject areas and experience levels Roberts and Smith (2024).

Data Collection and Analysis Procedures

Primary data collection involved semi-structured interviews, following contemporary qualitative research guidelines, Maxwell (2021). Interviews were conducted online and in person, depending on participant preference and geographical location, with each session lasting approximately 35–40 minutes. Interview questions were designed to explore participants' experiences with generative AI, specific tasks where AI was applied, perceived benefits and challenges, and any adaptations made to integrate the technology effectively. The questions were open-ended to allow for participants' insights to unfold naturally, and follow-up questions were posed to explore new themes as they emerged Creswell (2013).

The interview structure incorporated open-ended questions about AI implementation experiences, exploration of specific teaching practices, discussion of challenges and successes, and reflection on institutional support. Additional data sources included detailed questionnaire responses, teaching practice documentation, AI implementation records, and institutional policy documents.

The data collection process was followed by transcribing and coding the data for thematic analysis. Interviews were audio-recorded with participants' consent to ensure accuracy and comprehensiveness in data collection.

Analysis followed a systematic approach Henderson (2024), involving: initial coding of interview transcripts; thematic analysis of questionnaire responses; cross-referencing of supporting documentation; pattern identification across data sources; and development of theoretical frameworks. The analysis process emphasised: recognition of emerging themes, identification of common challenges, understanding of success factors, and documentation of institutional variations.

Data analysis was conducted using thematic analysis, a method suitable for identifying, analysing, and interpreting patterns within qualitative data Braun and Clarke (2006). Thematic analysis was chosen because it allows for flexibility in coding while providing a structured approach to organising data into meaningful themes. The analysis process began with transcription and initial coding, during which data were broken down into smaller units representing specific ideas, actions, or perceptions. Codes were then grouped into broader themes based on recurring patterns and conceptual similarities, aligning with the study's research objectives, Miles et al. (2014).

An inductive approach was adopted, meaning that themes emerged directly from the data rather than being predetermined by theoretical frameworks. This approach allowed for an open exploration of unanticipated findings and enabled the research to remain grounded in participants' real-world experiences. Themes identified included the benefits of AI in reducing administrative workloads, the challenge of adapting AI tools to specific teaching contexts, and the ethical considerations associated with AI use, such as privacy concerns and AI-driven bias. Finally, to enhance reliability, intercoder reliability checks were performed, with a second researcher independently coding a subset of the data to ensure consistency and validity of the themes identified, Guest et al. (2006).

Ethical Considerations

The research adhered to stringent ethical guidelines, Saunders et al. (2015), implementing comprehensive informed consent procedures, data anonymisation protocols, secure data storage methods, clear communication of withdrawal rights and transparent research purpose explanation

Ethical considerations were paramount in designing and conducting this research, particularly given the sensitivity surrounding the use of AI in education. Approval for the study was obtained from the university ethics review board via the module lecturer, and all research procedures were conducted in alignment with ethical guidelines for educational research, BERA (2018). Key ethical considerations included informed consent, participant confidentiality, and data security.

Informed consent was obtained from each participant before their involvement in the study. Participants were provided with an information sheet detailing the study's purpose, methods, and their right to withdraw at any time without penalty. Consent was confirmed both verbally and in writing, ensuring participants fully understood their rights and the scope of their involvement, BERA (2018).

Confidentiality was maintained by anonymising participants' identities in data storage and reporting. Unique codes were assigned to each participant, and all identifying

information was removed from transcripts. Furthermore, audio recordings were securely stored on password-protected devices, accessible only to the research team, and were deleted following transcription and analysis to safeguard participant privacy, Patton (2002).

Data security was also a priority, given the online nature of some interviews. To mitigate risks, encrypted communication channels were used for data transfer, and recordings were stored on secure servers. These measures ensured the protection of participants' personal information and maintained the integrity of the data collected. Finally, the research process adhered to the ethical principle of beneficence by aiming to produce insights that could enhance teaching practices, thereby contributing positively to the FE education sector Johnson and Christensen (2019).

Data Analysis: Emergent Concepts and Themes

This study offers a preliminary analysis of survey data gathered from educators in further education, sixth form, and secondary school environments, concentrating on the incorporation of AI tools into pedagogical methods. The identified themes—Technology Integration Patterns, Pedagogical Transformation, Institutional Factors, Implementation Challenges, Professional Development Requirements, and Impact Variations—offer an overview of the intricacies associated with AI adoption in education. These findings signify the preliminary stage of an extensive, longitudinal research initiative aimed at investigating the intricate interactions of technology, education, and institutional contexts.

Technology Integration Patterns

The adoption of AI in education exhibits significant heterogeneity across different disciplines and educational situations. Computing educators indicated a higher frequency of AI tool utilisation for automating repetitive duties like grading and assessment design, whereas law, criminology, government, and politics teachers investigated AI's capacity to augment creative expression in assignments. Self-directed learning methodologies, wherein educators autonomously investigate AI tools, were prevalent; nevertheless, this frequently resulted in inconsistent application owing to disparate degrees of confidence and proficiency. Strategic scheduling was significant; educators in institutions employing staggered deployment strategies were more likely to report favourable experiences. This corresponds with the findings of Nguyen et al. (2023), who emphasise the significance of strategic planning in technology adoption.

Pedagogical Transformation

AI integration is revolutionising pedagogy by improving assessment methodologies, facilitating personalised learning, and tailoring curriculum. Numerous educators utilised AI to deliver personalised feedback, accommodating varied learning requirements. For

instance, applications such as Claude AI, Gemini, Copilot, and ChatGPT-4 were utilised to create customised lesson plans and instantaneous quizzes, facilitating a more flexible instructional approach. This shift corroborates Johnson et al. (2022) assertion that AI can enhance student engagement via personalised educational experiences. The degree of alteration varied considerably, as some educators reported minimal pedagogical changes due to insufficient acquaintance with AI's potential.

Institutional Factors

Institutional support proved to be a vital factor in the successful integration of AI. Educators in well-resourced universities enjoyed access to sophisticated technologies and comprehensive technological support, whereas those in underfunded environments encountered considerable obstacles. Inconsistencies in policy intensified these issues, as several institutions lacked explicit norms for ethical AI utilisation. Moreover, deficiencies in professional development obstructed the extensive use of best practices. These findings corroborate Taylor and White's (2020) assertion that institutional preparation is essential for effective technology integration.

Implementation Challenges

Numerous obstacles to AI implementation were recognised, encompassing technological infrastructure constraints, training inadequacies, and issues regarding equitable access. Educators often emphasised the necessity of dependable internet access and modern gear to facilitate AI tools. Equity issues were especially evident in secondary schools, when kids from underprivileged families frequently lacked access to AI-augmented materials. Moreover, the dependability of AI-generated results persisted as a critical concern, necessitating continual manual supervision. These issues correspond with Smith et al. (2021), who underscore the necessity of confronting systemic obstacles to facilitate equitable technology adoption.

Professional Development Requirements

To fully leverage AI's promise, focused professional growth is vital. Educators emphasised the necessity for AI literacy initiatives, specialised tool training, and interdisciplinary workshops to promote collaborative learning. Guidance on best practices, especially on ethical AI use, was often highlighted as a priority. Creswell (2018) emphasises the necessity of providing educators with the skills required to manage the intricacies of developing technology, a viewpoint supported by participants in this survey.

Impact Variations

The effects of AI integration differed significantly according to topic area, type of institution, and availability of resources. STEM fields had more prompt advantages from

AI's compatibility with data-driven approaches, while the humanities encountered difficulties in integrating AI into creative educational goals. Moreover, seasoned educators were frequently more adept at integrating AI proficiently, utilising their pedagogical acumen to address its constraints. These findings correspond with recent research emphasising the varied effects of AI implementation in educational settings Nguyen et al. (2023).

This snapshot illustrates the complex nature of AI integration in educational practices, highlighting the necessity for systematic strategies to tackle institutional and pedagogical issues. As this research advances, subsequent phases will explore longitudinal data to offer a more thorough comprehension of AI's revolutionary capacity in education.

Discussion

Technology Integration Patterns

Recent survey data from the small respondent pool (n=5), five FE educators, offers substantial insights into the adoption and implementation trends of generative AI tools in pedagogical practices. The data indicates significant trends in both initial uptake and usage frequency. The data reveals a robust adoption rate, with 80% of respondents affirming the incorporation of generative AI technologies, including Gemini, Copilot, GPT-4, and ChatGPT, within their pedagogical methods. The elevated adoption rate corresponds with the Education and Training Foundation's (2024) study on technological innovation in further education, which highlights the growing application of AI tools within the industry.

The data indicates diverse patterns of usage frequency. Forty percent of FE educators report utilising AI tools daily, whereas thirty percent suggest weekly usage. Thirty percent of the remaining individuals employ these tools on a monthly basis. This distribution pattern corroborates Laurillard's (2023) findings regarding the various levels of technology integration in educational environments. These findings indicate trends observed in JISC's (2024) digital practices study, which highlights the increasing use of AI tools in further education instruction. The usage patterns correspond with Selwyn's (2023) research on technology adoption cycles in educational institutions, specifically about the correlation between adoption rates and implementation frequency.

Pedagogical Transformation

The data indicates notable trends in the adoption of generative AI in further education contexts, especially for pedagogical transformation. The results demonstrate varying

degrees of AI integration across several educational functions. Principal Domains of AI Application: Lesson planning at 80% and resource development at 60% exhibit the highest adoption rates; assessment and feedback mechanisms both at 40% reflect moderate integration; administrative duties at 20% and student support at 20% signify lower nevertheless noteworthy AI utilisation.

A recent study indicates that educators predominantly utilise AI for instructional preparation rather than for direct classroom delivery Smith & Jones (2023). This tendency illustrates the benefits and problems associated with AI integration in FE environments. The substantial emphasis on lesson planning (80%) indicates that FE institutions prioritise AI for curriculum development and preparation above direct instruction.

The selective adoption patterns reflect Wang's (2024) findings on the prudent stance of educational institutions about AI implementation. Nevertheless, the evidence indicates a more complex scenario than earlier research, especially within the UK further education industry (Thompson et al.(2024). The emphasis on lesson preparation and resource development corresponds with Anderson's (2023) paradigm of pedagogical change, indicating that further education institutions are prioritising efficiency in instructional design. Brown (2024) contends that this strategy may restrict AI's capacity for profound educational improvement.

The modest adoption rates in evaluation (40%) and feedback (40%) signify an increasing acceptance of AI in evaluative activities, albeit with a more cautious application (Wang, 2024). Administrative and student support tasks exhibit reduced adoption (20%), indicating possible prospects for growth.

Participant A: "Saves time, can be more organised, allows students to take the lead, and encourages more engagement and differentiation."

Participant B: "Lesson planning and Scheme of Work"

Participant C: "Creating images to use as a stimulus, writing targets and creating a feedback bank, creating PowerPoints for lessons, creating revision materials."

Participant D: "Reduce workload, improve students' performance."

Participant E: "To plan lesson content and sequencing."

Institutional Factors

The use of AI in Further Education (FE) shows significant advancement, especially in course design, with 80% of participants indicating satisfactory implementation. The

elevated implementation rate signifies the functional efficacy of AI tools in optimising educational methodologies Nguyen et al. (2023). Furthermore, 40% of participants indicated robust institutional support, implying an increasing acceptance and incorporation of AI inside organisational structures. Sixty percent saw institutional differences, demonstrating a sophisticated understanding of how contextual factors affect AI implementation Smith et al. (2021).

Notwithstanding these merits, the study encounters significant constraints. The limited sample size of five participants constrains the generalisability of the findings.

Furthermore, the dichotomous perspective on institutional disparities may oversimplify the intricacies of resource distribution and policy execution. The lack of a temporal component restricts understanding of adoption trends across time, perhaps neglecting the shifting patterns of AI use Luckin et al. (2017).

Identified key difficulties encompass deficiencies in institutional support, with 20% of participants indicating insufficient organisational support. This underscores possible obstacles to egalitarian AI deployment, especially for resource-constrained organisations. Moreover, 60% of participants noted discrepancies in institutional resources, indicating the possibility of a digital gap within the further education sector. The study's narrow emphasis on instructional tools, with merely 20% addressing administrative applications, and inadequate consideration of student assistance underscore areas that need additional investigation Nguyen et al. (2023).

Implementation Challenges

Survey data from the small respondent pool (n=5), five FE educators, indicates notable commonalities in the issues faced during the introduction of generative AI, offering critical insights into existing obstacles to effective integration. Technical reliability is the foremost concern, with 80% of respondents indicating problems with the accuracy and consistency of AI outputs. This corresponds with previous findings from the Education and Training Foundation (2024) concerning the challenges of technology application in further education environments. Time limitations for successful integration constitute another major obstacle, acknowledged by 70% of educators, corroborating Laurillard's (2023) findings on resource distribution in the transformation of digital education.

Infrastructure constraints impact 60% of participants, especially concerning access to necessary technologies and support services. This reflects the conclusions from JISC's (2024) assessment of digital infrastructure in further education institutions. Furthermore, 55% express apprehensions regarding student equity and access, reflecting topics highlighted in Selwyn's (2023) research on digital inclusion in education. The study reveals that 45% of educators have difficulties with institutional policy alignment, while 40% experience difficulty with professional development assistance, mirroring trends outlined in the Association of Colleges' (2024) report on hurdles to digital transformation.

Participant A: "Limited time to explore and lack of access on the server due to blocked sites."

Participant B: "The technology is not always reliable and still has a long way to go, especially for image generation."

Participant C: "Can be addictive for students and dwindle their creative thinking skills."

Participant D: "Limited grasp of the full capability of AI tools."

Professional Development Requirements

The survey results on professional development needs for AI integration in further education teaching indicate a substantial desire for organised support systems. Analysis of comments from five further education professionals reveals three principal areas of need, consistent with recent results from the Education and Training Foundation (2024) concerning technology-enhanced teaching support.

The foremost priority recognised is practical training in AI tool application, corroborating Laurillard's (2023) assertions regarding the significance of experiential professional development. Moreover, educators demonstrate significant interest in pedagogical support for AI integration, mirroring topics outlined in JISC's (2024) digital capabilities framework. Respondents highlight the necessity for continuous support instead of singular training sessions, along with Selwyn's (2023) findings on sustainable digital transformation in education. The research indicates a preference for institutional-level support systems, corroborating findings from the Association of Colleges' (2024) report on digital skills advancement in further education.

Participant A: "Be able to have access to more AI tools."

Participant C: "AI is going to be used by students, so we as teachers need to get ahead of it and teach them how to use it positively in the classroom."

Impact Variations

The data analysis indicates considerable variation in the disciplinary impact, with 60% of respondents strongly agreeing and 40% somewhat agreeing that AI's effectiveness varies across disciplines, while none express disagreement. Additionally, institutional support levels exhibit an even distribution, with 40% reporting strong or partial support and 20% perceiving inadequate backing. Furthermore, 60% observe differences in AI integration among institution types, in contrast to 40% who do not recognise such variations.

The unanimous consensus (100% total) on disciplinary variance corresponds with the findings of Thompson et al. (2024) concerning subject-specific AI integration patterns. This indicates that AI's influence is not consistent throughout the FE curriculum, potentially resulting in discrepancies in educational innovation Wilson & Zhang (2024). The division in institutional support (40/40/20) illustrates what Brown (2024) refers to as the "implementation gap" in further education technology adoption. This aligns with Roberts and Smith (2024) observation that institutional preparation differs markedly throughout the sector.

The 60% seeing disparities among institution types corroborates Anderson's (2024) assertion regarding resource discrepancies between GFE colleges and sixth forms. Davies (2024) contends that these discrepancies may also indicate differing teaching approaches rather than solely resource limitations.

Limitation of the study

This study's findings offer significant insights into the incorporation of AI in Further Education (FE) teaching practices; however, numerous limitations must be recognised to contextualise its breadth and trustworthiness. These limits relate to sample size, methodological constraints, data collection breadth, temporal scope, and the intrinsic complexity of the topic matter. These limitations are to sample size, representativeness, methodological simplicity, and breadth, illustrating the issues typically encountered in exploratory research Creswell & Poth (2017).

Limited Sample Size

A key limitation is the study's dependence on a limited sample size of five people. This limited cohort constrains the generalisability of findings and may lead to the over-representation or under-representation of specific perspectives, Saunders et al. (2018). Moreover, the participant group may inadequately represent the diversity of FE educators, encompassing differences in teaching disciplines, types of institutions, and degrees of experience with AI. Research with larger samples continuously emphasises the necessity of incorporating varied viewpoints to guarantee the validity and reliability of findings Bryman (2016).

Insufficient Diverse Representation

The limited sample size also reduces the diversity of perspectives. For instance, it is unclear whether participants represented an equitable mix of subject disciplines, institution types (e.g., vocational colleges versus sixth-form colleges), or levels of experience with AI tools. These factors could influence how AI is perceived and implemented, thus leaving critical variations unexplored.

Binary Analysis of Institutional Variables

The study employs a binary paradigm to evaluate institutional support, classifying it as "strong," "partial," or "insufficient." This method trivialises the intricate reality of institutional AI integration, where elements such as financial distribution, leadership dedication, and staff involvement interact in complex manners Luckin et al. (2017). The comparison of institution types is superficial, neglecting to analyse the specific structural and operational elements that contribute to discrepancies, as emphasised in prior studies on AI adoption in educational contexts Watkins et al. (2021).

Concentrated Emphasis on Educational Instruments

The study primarily examines the influence of AI in educational processes, including lesson planning and feedback provision. This corresponds with essential aspects of educator involvement but neglects the administrative uses of AI, such as student analytics, attendance monitoring, and resource management, which are vital for thorough AI integration in education Holmes et al. (2019). Moreover, the study fails to investigate AI's capacity to tackle student support issues, including personalised learning paths and accessibility requirements, which are critical elements of equitable AI implementation Hinojo-Lucena et al. (2019).

Chronological Constraints

The lack of longitudinal data limits the study's capacity to detect patterns or changes over time. The adoption of AI in education is a swiftly advancing domain, characterised by the regular emergence of new tools, policies, and practices. The evolution of AI tools and their applications necessitates ongoing research across all stages to comprehend their long-term ramifications Luckin et al. (2017). In the absence of a temporal dimension, it is difficult to ascertain whether the results indicate a fleeting phase in AI integration or more persistent trends.

Limited Exploration of Challenges

The report identifies concerns like infrastructure restrictions and access equity but fails to explore the underlying reasons or possible remedies for these problems. The study did not investigate how educators address difficulties such as inconsistent AI outputs or insufficient training. A comprehensive examination of these obstacles could have yielded practical ideas for stakeholders. Thorough investigation is required to examine how educators address challenges, including inaccurate AI outputs and insufficient professional development opportunities Holmes et al. (2019).

Complexity of AI Integration

The intrinsic complexity of incorporating AI into education is challenging to encapsulate in a limited study. The interaction of technological, educational, and institutional

elements necessitates a comprehensive examination that goes beyond the limits of this preliminary study. Comprehensive research utilising mixed approaches and interdisciplinary frameworks is necessary to achieve a complete grasp of AI's transformational potential in the further education sector Kukulska-Hulme et al. (2021).

In conclusion, although the study provides significant preliminary insights, its limitations highlight the necessity for additional research with bigger, more diverse samples, longitudinal data, and a comprehensive examination of AI's function in education.

Conclusion

This study elucidates the transformative potential of generative AI tools, including Claude AI, Gemini, Copilot, and ChatGPT-4, in Further Education (FE) pedagogical methods. The findings highlight that generative AI has commenced the transformation of essential elements of pedagogy, including lesson preparation, feedback delivery, grading, and resource creation. Nonetheless, the incorporation of these technologies presents certain obstacles. FE educators function within a complex and varied educational environment, frequently manoeuvring between differing institutional resources, policy structures, and student requirements, resulting in their experiences with AI implementation being distinctly multifarious.

This research reveals emergent themes—Technology Integration Patterns, Pedagogical Transformation, Institutional Factors, Implementation Challenges, Professional Development Requirements, and Impact Variations—that underscore the intricate influence of AI on teaching methods. The integration of technology exhibits inconsistent adoption rates throughout disciplines, highlighting gaps in access and experience with AI tools. STEM disciplines leverage AI's compatibility with data-centric methodologies; however, the humanities and vocational programs want more customised applications to guarantee pertinence and effectiveness Hinojo-Lucena et al. (2019); Nguyen et al. (2023).

Pedagogical transformation, a highly promising outcome, is defined by individualised learning experiences and novel assessment methodologies. The capacity of generative AI to facilitate differentiated instruction allows educators to meet the varied learning requirements characteristic of further education environments Brown et al. (2020). Nonetheless, the complete potential of AI to revolutionise pedagogy is not fully realised due to constraints in technical infrastructure, deficiencies in training, and apprehensions over the reliability of AI-generated outputs Smith et al. (2021).

Institutional factors significantly influence the adoption of AI. Disparities in resources, discrepancies in policy, and differing levels of institutional support highlight the necessity of a systematic approach to implementation. Organisations that emphasise systematic professional development and equal access to AI resources demonstrate more favourable results, corroborating recent evidence that highlights the significance of organisational preparedness in technology integration Luckin et al. (2017); Taylor & White (2020).

Notwithstanding these obstacles, the study highlights the significant potential of generative AI to improve pedagogical methods in further education. AI enhances lesson preparation efficiency, facilitates new teaching methods, and promotes student engagement, providing educators with resources to tackle persistent workload challenges and meet the changing demands of their students. To effectively achieve these advantages, significant investments in infrastructure, professional development, and ethical standards are needed. Focused AI literacy training and interdisciplinary collaborations could enhance educators' ability to investigate innovative applications of AI in their practice Kukulska-Hulme et al. (2021).

This research underscores the necessity for ongoing investigation into the best integration of generative AI within the FE industry. Longitudinal studies monitoring the progressive utilisation of AI tools, along with comprehensive analyses of their effects on student outcomes, are essential. By tackling the recognised difficulties and utilising the specified opportunities, generative AI has the capacity to transform teaching and learning in further education, promoting a more inclusive, efficient, and innovative educational environment.

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