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Emerging Framework for AI-Enhanced Development of Multiple-Choice Questions: Foundational Stages and Future Pathways

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Abstract

This paper proposes a structured framework for integrating Generative Artificial Intelligence (GenAI) technologies into the development of multiple-choice questions (MCQs), offering a progressive pathway for educators to leverage AI's potential in enhancing assessment practices.

The framework begins with foundational techniques, such as one-shot and few-shot prompting, and progresses to more advanced methodologies, including Retrieval-Augmented Generation (RAG) and fully automated adaptive AI systems. By addressing technical, ethical, and pedagogical considerations, the framework highlights how AI can improve efficiency, personalisation, and scalability in assessment creation. Key challenges, such as data privacy, algorithmic bias, and resource constraints, are critically examined to ensure equitable implementation.

The paper further underscores the evolving role of educators, who, empowered by AI-driven tools, can focus on fostering deeper learning experiences and critical thinking. This study contributes to the growing body of research on AI in education by offering practical strategies for embedding GenAI into diverse educational contexts while upholding pedagogical integrity.

Key words: Generative Artificial Intelligence (GenAI), Multiple-Choice Questions (MCQs), Retrieval-Augmented Generation (RAG), Personalised Learning, Educational Technology.

Introduction

The evolution of Generative Artificial Intelligence (GenAI) marks a pivotal advancement in educational technology, offering unprecedented opportunities for personalised learning. Rather than emerging abruptly, GenAI is the culmination of decades of innovations, progressing from rudimentary computer-based learning systems to sophisticated adaptive platforms capable of generating highly contextual and adaptive content tailored to individual learners.

Personalised education began with early EdTech tools like PLATO and CAI in the 1960s, which provided tailored instruction through basic adaptations to student responses. These foundational systems paved the way for Intelligent Tutoring Systems (ITS) in the 1990s. Despite offering rule-based, customised feedback, ITS models faced limitations in scalability and diversity, as noted by Rokhman and Kobar (2022). By the 2000s, platforms like ALEKS and Knewton leveraged machine learning algorithms to provide responsive educational experiences but lacked generative capabilities (Anwar et al., 2022). The 2010s witnessed a transformation driven by deep learning advancements, with innovations such as Convolutional Neural Networks and Generative Pre-trained Transformers (GPTs). OpenAI's GPT-2 and GPT-3 introduced AI systems capable of creating coherent, context-aware content, revolutionising personalised education (Mousavi et al., 2024). These advancements extended AI's role in assessment design, enabling automated generation of Multiple-Choice Questions (MCQs) tailored to students' cognitive levels (Frisch-Aviram et al., 2024).

While GenAI's potential is transformative, it raises ethical challenges, including bias and data privacy concerns (UNESCO, 2023). This paper proposes a framework for integrating GenAI into assessments, balancing innovation with pedagogical integrity to enhance inclusivity and effectiveness in educational practices.

Theoretical Background

Educators remain apprehensive about integrating AI into classrooms despite its potential benefits. A survey by the AI Education Project (aiEDU) revealed that 55% of educators are somewhat or extremely fearful of AI adoption, with 65% concerned about its pitfalls, such as job security threats and dehumanised learning (Lucariello, 2024). A lack of training and experience with AI tools amplifies these concerns, as 52% of K-12 educators surveyed had not used AI themselves despite being aware of it. This reflects broader scepticism about AI's impact on teaching and learning environments, underscoring the need for professional development and support to integrate AI effectively (Young, 2024; Adlawan, 2024). Educators recognise AI's potential to automate administrative tasks, enhance lesson planning, and improve personalised learning. However, they also identify challenges such as implementation costs, over-reliance on technology, and ethical concerns, particularly regarding bias and accountability (Ascione, 2024; Jiang & Zhou, 2024). Addressing these issues is essential for ensuring AI's effective and equitable integration into education systems.

MCQs and AI

Multiple-choice quizzes have significantly transformed educational assessments since Frederick J. Kelly introduced them in 1916. Initially designed for efficiency in assessing large groups, MCQs gained widespread use during World War I and became prominent in the mid-20th century with the advent of automated grading systems (Madaus & O'Dwyer, 1999). Their objectivity and broad content coverage have made them a cornerstone in academia (Butler, 2018). Over time, well-designed MCQs evolved to assess higher-order cognitive skills like analysis and application, featuring clear wording and plausible distractors (Haladyna, Downing, & Rodriguez, 2002). However, poorly crafted MCQs may encourage superficial learning or introduce bias, disadvantaging students excelling in alternative assessments (Roediger & Marsh, 2005; Popham, 2017). Ongoing research in test design aims to address these issues, enhancing fairness and effectiveness (Downing, 2002). Digital platforms have further revolutionised MCQs, providing immediate feedback and frequent, formative assessments aligned with constructivist learning theories (Gikandi, Morrow, & Davis, 2011). As educational technologies advance, MCQs continue to adapt, cementing their role in modern assessment practices.

AI has revolutionised MCQ development by enhancing both efficiency and quality. Tools like ChatGPT leverage large language models to generate comprehensive, contextually relevant questions. AI

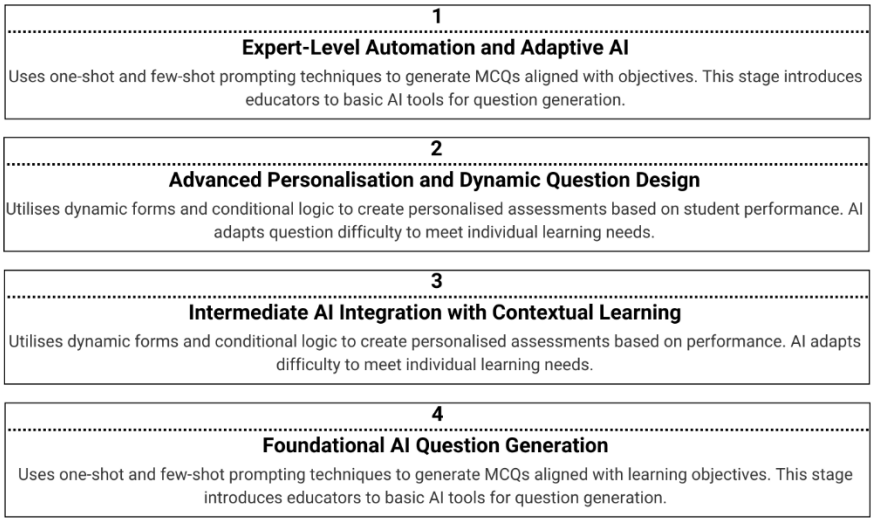
effectively creates high-quality distractors by identifying common misconceptions, thereby improving the discriminatory power of questions (Shin, Guo, & Gierl, 2019). This automation streamlines the traditionally time-intensive process of question generation, enabling educators to focus on refinement while maintaining high standards (Kasneci et al., 2023). By automating MCQ creation, AI supports scalability and helps address diverse learning needs, blending efficiency with innovation to advance educational assessments and improve learning outcomes.

Framework Development

This framework offers a structured approach for educators to integrate AI technologies, particularly generative models like GPT, into the development of multiple-choice questions (MCQs). It aims to address the apprehension many educators feel about AI by presenting a progressive methodology to enhance assessment quality, efficiency, and personalisation while maintaining pedagogical integrity.

At its core, the framework utilises prompting techniques, a critical skill for effective AI use. According to IBM (n.d.), "Good prompts equal good results," emphasising the importance of crafting clear and specific inputs to achieve high-quality AI outputs. The techniques within the framework range from basic strategies to advanced applications, all of which can be implemented using accessible AI tools like GPT models without requiring technical expertise. Through these techniques, the framework empowers educators to harness AI for innovative and adaptable assessment creation. By employing AI strategically, educators can streamline MCQ development, generate diverse and tailored questions, and ensure alignment with educational goals. This systematic approach supports educators in leveraging AI to create assessments that foster meaningful learning and adapt to the evolving needs of students.

Figure 1 - Prompting techniques and increasing complexity



1. Foundational AI Question Generation

This foundational stage introduces educators to the potential of AI-driven question generation, utilising one-shot and few-shot prompting techniques. These methods rely on carefully crafted prompts to guide the AI in generating multiple-choice questions (MCQs) aligned with specific learning objectives. For instance, a single-shot prompt might request the creation of a 20-question MCQ set covering macroeconomic principles like inflation and fiscal policy. While straightforward, this approach serves as a vital entry point for those new to AI-assisted educational tools. Few-shot prompting builds on this by providing the AI with a set of examples, enabling it to better understand the expected format, tone, and complexity of questions. For instance, a prompt might include two sample questions on fiscal policy, such as "What is the primary goal of fiscal policy during an economic recession?" followed by "How does government spending influence aggregate demand?" This technique improves the AI's ability to produce diverse and accurate questions, aligning them with the educator's goals.

While efficient, this stage focuses on surface-level knowledge and requires manual oversight to ensure the quality and alignment of outputs. It lays the groundwork for educators to integrate AI into their workflow while gradually advancing to more sophisticated methodologies in subsequent stages.

2. Intermediate AI Integration with Contextual Learning

The intermediate stage introduces Retrieval Augmented Generation (RAG), enhancing the quality and contextual relevance of AI-generated MCQs by integrating external resources like textbooks sections, research papers, or institutional guidelines. Through RAG, the AI model can retrieve and analyse relevant information, producing questions that align more closely with specific learning objectives and course content.

Dynamic AI forms can play a pivotal role in simplifying the process for educators by automating the prompting process. Instead of crafting complex prompts manually for every interaction, the most useful prompts can be integrated within an AI form. Users fill out pre-designed forms with inputs like the course subject, key topics, and uploaded documents, which are then automatically processed using the given specialised prompt. For example, an educator teaching environmental science might upload a recent article on deforestation, alongside learning objectives, enabling the AI to generate questions that are both accurate and targeted. Techniques like self-consistency sampling can further enhance the process by generating multiple versions of each question and selecting the most accurate and relevant option. This stage also leverages Tree of Thoughts (ToT) prompting, which encourages the AI to explore different reasoning paths before finalising a question. By synthesising diverse perspectives, the AI ensures that the questions not only address factual knowledge but also challenge students to engage in critical thinking and problem-solving. This level bridges the gap between simple automation and personalised learning tools, offering educators an efficient way to create MCQs that reflect nuanced understanding and contextual accuracy, while maintaining adaptability across various subjects.

3. Advanced Personalisation and Dynamic Question Design

At the advanced stage, AI integrates dynamic forms with conditional logic to deliver personalised assessments tailored to individual student needs. This approach combines sophisticated data retrieval and processing capabilities with insights drawn from student performance metrics, creating questions that address specific learning gaps while challenging advanced learners. Dynamic forms allow educators to specify key parameters, such as course topics, uploaded source materials, and student profiles. For instance, an AI-generated assessment for a unit on climate policy could include basic, recall-based questions for struggling students and complex, analytical questions for those with a stronger grasp of the material. By analysing student performance data, the AI tailors its outputs to cater to varying proficiency levels, ensuring that all learners remain engaged and supported.

Conditional logic further enhances this process by adjusting question difficulty and focus in real-time based on the data provided. For example, students excelling in the fundamentals of deforestation might receive questions requiring them to evaluate long-term ecological impacts, while others are presented with simpler questions focused on cause-and-effect relationships. Advanced techniques like ToT prompting ensure that questions are thoughtfully constructed, drawing on multiple sources and perspectives to encourage deeper understanding. This stage emphasis inclusivity and adaptability, allowing educators to create assessments that not only evaluate knowledge but also foster critical thinking, problem-solving, and engagement.

4. Expert-Level Automation and Adaptive AI

The expert level leverages fully automated Agentic Retrieval Augmented Generation (RAG) to address complex and dynamic classroom needs with minimal manual input. This system relies on autonomous AI agents capable of memory retention and multi-tasking to manage retrieval, analysis, and question generation tasks. These agents independently decompose complex queries, retrieve pertinent data, and adjust strategies dynamically based on evolving classroom data such as student performance metrics, course updates, and institutional goals.

This adaptive system ensures real-time responsiveness. For example, if quiz results reveal widespread misunderstanding of a topic, the AI prioritises reinforcing those areas through tailored questions. Such

responsiveness is achieved through continuous data integration, enabling the AI to incorporate updates from various sources, such as research papers, attendance records, and student feedback, into its question-generation processes. Advanced personalisation ensures the output aligns with the specific needs of different student groups, spanning foundational concepts to interdisciplinary analysis.

The system supports long-term educational goals by aligning with departmental standards, such as promoting critical thinking or adhering to Bloom's Taxonomy. Bloom's Taxonomy is a hierarchical framework for classifying educational objectives into levels of complexity and specificity, aiming to promote higher-order thinking skills such as analysis, evaluation, and creation (University of Illinois Chicago, n.d.). This ensures generated content meets immediate classroom needs and broader institutional objectives. While maximising efficiency and personalisation, its implementation requires a structured setup and strong data governance to ensure privacy and compliance with educational standards. This stage exemplifies AI integration in education, providing educators with a comprehensive tool to enhance assessment quality and learning outcomes across academic contexts.

Discussion

The proposed framework for integrating GenAI into multiple-choice question (MCQ) development offers transformative potential in education, enhancing efficiency, scalability, and personalisation. By guiding educators through a structured progression, it addresses apprehensions about AI while enabling its gradual adoption. This tiered approach equips educators to integrate AI tools at a manageable pace, promoting confidence and fostering widespread acceptance.

One of the framework's significant contributions is its ability to streamline MCQ generation, increasing efficiency and scalability. Educators can produce large sets of high-quality questions, enabling frequent and diverse assessments. This enhanced capability improves evaluations, covering varied cognitive levels and topics, fostering comprehensive student understanding. Frequent assessments also facilitate timely identification of learning gaps, allowing educators to adjust teaching strategies and improve outcomes. The framework's emphasis on personalisation tailors' questions to individual student needs. By integrating dynamic AI forms and student data, educators can deliver customised questions catering to varying abilities and learning trajectories. Advanced students may tackle interdisciplinary challenges, while foundational learners engage with reinforcement-based assessments. This approach fosters engagement and offers educators deeper insights into student progress, enabling more informed decision-making.

Despite its advantages, implementing advanced AI systems introduces challenges. Higher tiers of the framework require significant technical infrastructure, expertise, and seamless integration with existing Learning Management Systems (LMS). Many educational institutions may struggle to allocate necessary resources, potentially exacerbating inequalities in technology access. Ensuring data privacy and security when using student information is paramount. Robust safeguards must protect sensitive data and ensure compliance with educational regulations. Ethical considerations also demand attention. AI systems can inadvertently introduce bias into assessments, whether through cultural assumptions, content focus, or difficulty levels, potentially disadvantaging groups (Chinta et al., 2024). Transparency in AI processes is essential to mitigate risks, enabling educators to understand and refine generated content effectively. By maintaining fairness and inclusivity, institutions can foster trust and uphold the integrity of AI-assisted assessments.

The framework redefines the role of educators, shifting their focus from routine content creation to strategic and analytical tasks. With AI handling technical aspects, educators can dedicate more time to interpreting assessment results, refining learning objectives, and providing personalised support to students. This evolution aligns with broader trends towards student-centred, data-driven education, positioning educators as facilitators of enriched learning experiences. Looking ahead, advancements in AI technologies, such as adaptive learning systems and enhanced natural language processing, hold the potential to refine this framework further. Cross-disciplinary research at the intersection of AI, education, and cognitive science could deepen understanding of how AI impacts learning outcomes, informing the development of more effective tools. By addressing technical and ethical challenges and prioritising human-centred education, this framework offers a transformative opportunity to enhance teaching and learning outcomes, driving innovation in educational practices.

Conclusion

The integration of GenAI into educational assessments marks a transformative step in achieving personalised, efficient, and scalable learning experiences. The framework proposed provides educators with a structured approach to gradually adopt GenAI, bridging the gap between innovation and practical application. By enabling progressive integration, the framework fosters confidence among educators while ensuring pedagogical soundness. Key strengths of GenAI lie in its ability to automate MCQ generation, enhancing efficiency without compromising quality. This scalability allows educators to focus on strategic teaching objectives, such as fostering critical thinking and deep learning. Furthermore, the framework demonstrates GenAI's potential for tailoring assessments to individual students, promoting inclusivity and more accurate evaluations of learning progress.

However, challenges remain. Ethical concerns, such as algorithmic bias and data privacy, necessitate stringent safeguards and transparency to maintain trust and fairness. This highlights the question of if institutions will be receptive to implementation, with short term resistance likely. The technical demands of implementing advanced GenAI systems also require significant investment in infrastructure and professional development, which could strain institutions with limited resources. Looking forward, the role of GenAI in education should augment, rather than replace, the human element of teaching. By balancing technological innovation with ethical and pedagogical priorities, GenAI can become a powerful ally in creating meaningful, equitable learning experiences. Its success will ultimately be measured by its ability to enrich the educational journey of every student, ensuring that technology serves as a tool for empowerment and growth. With regard to the framework developed, this paper serves as a foundational step towards a comprehensive model, with future work planned to expand upon each tier through detailed implementation guidelines and practical recommendations across diverse educational contexts.

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Bridging the Gap: Revising UNESCO's AI Competency Framework for University Educators

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Abstract

This paper critically examines UNESCO's AI Competency Framework for Teachers and evaluates its suitability for Higher Education (HE). Although the framework offers a structured, ethically grounded approach to AI adoption, its design primarily targets K-12 settings, resulting in gaps when applied to HE's more complex demands. Two central critiques guide this analysis: (1) insufficient differentiation among AI typologies (predictive, prescriptive, and generative) and unrealistic expectations or misinterpretation regarding educator progression, and (2) lack of additional dimensions required to reflect the specialised and research-intensive roles of HE educators. Drawing on TPACK (Technological, Pedagogical, and Content Knowledge) principles and socio-technical perspectives, this paper proposes a revised "Comprehensive Competency Framework for Higher Education Educators" (CFHE), additionally introducing "Acquire Plus," "Deepen Plus," and "Create Plus" levels. By incorporating these HE-specific adaptations, the UNESCO framework can better harness AI's transformative potential while safeguarding academic integrity, inclusivity, and innovation.

Key words: AI competency Frameworks, UNESCO AI Framework, Higher Education Educator Competencies, Generative AI and Pedagogy, TPACK in AI Integration

Introduction - Overview of AI in Education

The rapid evolution of artificial intelligence, particularly Generative AI (GenAI), is reshaping global education, influencing instructional design, research activities, and administrative processes. Within

classrooms, AI tools such as adaptive learning systems and intelligent tutoring platforms promote personalised learning by analysing student performance data and recommending targeted interventions (Ng et al., 2023, pp. 137–161; Xu et al., 2024). In research, AI has the potential to streamline tasks ranging from literature reviews and data analysis to predictive modelling, potentially improving both efficiency and quality. Meanwhile, in administrative domains, AI promises an easier automation of admissions processes and performance tracking, freeing educators to focus on strategy and innovation.

In response to AI's expanding role in education, UNESCO introduced its AI Competency Framework for Teachers (UNESCO, 2024). The framework classifies competencies into three main levels, Acquire, Deepen, and Create, accompanied by guidelines on ethical integration, responsible AI use, and continuous professional development (Cho, 2024). While originally designed for K-12 contexts, many institutions at the tertiary level also look to it for guidance. However, HE's disciplinary breadth and research-focused profile require more advanced competencies, such as designing AI-driven research, formulating institutional policy, and collaborating across international, interdisciplinary networks. Moreover, there is a growing interest in leveraging TPACK-based professional development models to help educators develop targeted AI skills (Sun et al., 2022, pp. 1509–1533; Zulianti et al., 2024). These emerging needs highlight the UNESCO framework's limitations in adequately differentiating AI typologies and providing career-stage alignment for HE educators.

Given AI's increasingly central role in teaching, research, and leadership, aligning educators' competencies with HE's distinctive requirements has become urgent. Although UNESCO's framework lays a valuable foundation, it has not been extensively tailored to HE's interdisciplinary challenges. Hence, this paper aims to start the process of evaluating UNESCO's framework and its applicability to HE, analyse the gaps around AI typologies, and briefly propose enhancements to the CFHE with additional skill levels.

Literature Review: Applicability of the UNESCO AI Competency Framework for Teachers

Introduction to the UNESCO framework, comparisons, strengths and weaknesses

The UNESCO AI Competency Framework for Teachers offers foundational guidance for integrating AI into education, emphasising ethical considerations, pedagogy, and professional development (Cho, 2024; UNESCO, 2021). As AI adoption grows, particularly in higher education (HE), its dual role as an enabler of innovation and a source of risks warrants critical analysis. Recent studies highlight challenges in implementing the framework. Educators often lack foundational AI literacy, limiting effective integration (Bitegeko et al., 2024; Xu et al., 2024). Professional development initiatives provide a foundational starting point but could benefit from greater specificity to address advanced research capabilities and the unique competencies required in higher education.

(Raza, 2024; Zulianti et al., 2024). Similarly, ethical and governance concerns, including bias, privacy, and data integrity, remain underexplored (Misiejuk & Wasson, 2017). Schaeffer et al. (2024) underscore these issues, identifying risks inherent in AI applications, such as bias, transparency, and data confidentiality. They advocate for adopting Risk Management Frameworks (RMFs), like the NIST AI Risk Management Framework (AIRMF) and ForHumanity's Independent Audit, to mitigate these risks. For example, transparency is critical for understanding how AI applications are developed and operate, enabling stakeholders to assess their reliability. However, the tension between transparency and security highlight the complexity of implementing AI responsibly in educational contexts.

The Comprehensive Competency Framework for Higher Education Educators (CFHE) expands upon UNESCO's model, addressing specialised roles and risks unique to HE. The CFHE's enhanced tiers, Acquire Plus, Deepen Plus, and Create Plus, emphasise adaptive systems, interdisciplinary collaboration, and policy leadership. Schaeffer et al. (2024) identify data integrity, confidentiality, and bias as critical risks in AI applications, reinforcing the CFHE's focus on ethical and technical competencies. For example, data persistence and repurposing can introduce inaccuracies,

undermining predictive models' reliability. By incorporating RMFs, educators can ensure robust data governance, aligning AI applications with institutional goals and societal values.

The UNESCO framework's ethical foundation and structured progression model remain its strengths, providing a clear developmental pathway for educators (Mikeladze et al., 2024; Raza, 2024). However, its limitations, particularly in addressing risks identified by Schaeffer et al. (2024), highlight the need for a more nuanced approach. Key limitations include insufficient technical depth and a lack of interdisciplinary scope. For instance, the framework overlooks the distinct implications of predictive, prescriptive, and generative AI, treating them monolithically. This gap is critical, given the potential for systemic bias, as identified in Schaeffer et al. (2024). They note that outdated training datasets or unconscious developer biases can perpetuate discrimination, undermining AI's utility in admissions or resource allocation. Moreover, the framework's emphasis on the Create stage may lead to misinterpretations, such as assuming that all educators must possess advanced technical skills to develop AI solutions. This is an unrealistic expectation, given the diverse roles and expertise levels across the education sector. Schaeffer et al. (2024) suggest that institutions should adopt RMFs to guide AI development and deployment, ensuring equitable and effective applications.

Integrating AI Typology into Higher Education Frameworks

Although UNESCO's AI Competency Framework provides a structured progression (Acquire–Deepen–Create) for educators, it does not comprehensively address the distinct functionalities and implications of different AI typologies. Recent scholarship (Raza, 2024; Schaeffer et al., 2024) identifies predictive, prescriptive, and generative AI as three key categories relevant to education:

1. Predictive AI uses machine learning models to forecast outcomes or identify patterns in educational data (e.g., dropout prediction, performance analytics).

2. Prescriptive AI goes a step further, suggesting optimal interventions or courses of action (e.g., recommending tailored learning pathways).

3. Generative AI creates new content—text, images, code—based on existing data (e.g., chatbots, automated content generation).

While UNESCO's framework references ethical usage and skill progression, it largely treats AI as a monolithic entity (Misiejuk & Wasson, 2017; UNESCO, 2021). Differentiating these AI typologies within competency frameworks is essential because each type brings unique pedagogical, ethical, and research complexities to higher education (HE). For instance, generative AI may raise novel questions about authorship and academic integrity, whereas predictive or prescriptive AI can introduce risks related to bias and student autonomy (Schaeffer et al., 2024).

Findings and Discussion

Alignment and Shortfalls in Higher Education Contexts

Many of UNESCO's core elements—ethical AI usage, progressive skill-building, and a continuous learning mindset—align with HE's foundational needs. These strengths resonate particularly where educators are adopting AI tools for adaptive learning, intelligent tutoring systems, and data-driven evaluations (Ng et al., 2023; Xu et al., 2024).

However, the heightened demands of HE reveal critical shortfalls:

- **AI Typologies**: Predictive, prescriptive, and generative AI each present unique pedagogical, ethical, and research implications. For instance, generative AI raises novel issues around authorship and academic integrity, while prescriptive AI triggers ethical debates about student autonomy (Raza, 2024).

- **Research-Intensive and Leadership Roles**: HE educators may be responsible for directing doctoral research, managing large-scale data projects, or shaping AI policies. These roles extend beyond the capacities outlined in UNESCO's 'Acquire–Create' continuum.

Additionally, institutions establishing centers of excellence have shown how advanced AI leadership competencies can transform governance and policy at the institutional level—an approach not thoroughly addressed in the current UNESCO model (Survey: 86% of Students, 2024; Emory's AI Humanity Initiative, 2024).

Integrating TPACK and Socio-Technical Perspectives

Research indicates that TPACK-based professional development can significantly enhance educators' capacity to integrate AI effectively (Sun et al., 2022, pp. 1509–1533; Zulianti et al., 2024). By explicitly embedding TPACK into the UNESCO framework, educators can develop a holistic understanding of how AI intersects with pedagogy and content knowledge. Meanwhile, socio-technical considerations highlight that AI adoption in HE depends not only on individual skills but also on institutional policies, ethical governance, and resource allocation (Ghnemat et al., 2022, pp. 224–241).

In this vein, AI readiness assessments that account for infrastructural, policy, and cultural dimensions have emerged (Educause & AWS, 2024), underlining how organizational context can enable or hinder educators' progression from Acquire to Create—or further, to the "Plus" levels.

Detailed Integration of AI Typologies into the UNESCO Framework and CFHE

1. **Equal Relevance Across Levels**

Contrary to assumptions that certain AI types are inherently more complex, all three typologies, predictive, prescriptive, and generative, have **r**elevance at every stage. At a beginner or Acquire level, educators might explore simple generative tools (e.g., brainstorming aids) or basic predictive analytics (e.g., identifying struggling students). At a more advanced or Create level, those same educators could expand their generative AI usage (e.g., prompt-engineering for discipline-specific chatbots) or delve deeper into institutional predictive modeling.

2. **Ease of Generative AI Prototyping**

Generative AI can often be simpler to configure at advanced levels thanks to out-of-the-box language models compared to building custom predictive or prescriptive solutions. For example, an educator at the *Create Plus* level might quickly stand up a generative AI pilot for departmental use (e.g., a Q&A chatbot) with only moderate knowledge of prompt engineering and retrieval-augmented generation (RAG). Meanwhile, implementing a fully-fledged predictive analytics pipeline for institutional decision-making might require extensive data engineering support.

3. Differentiated Pathways examples:

a. Foundational Pathway: Educators build **basic AI literacy**, learning to distinguish predictive, prescriptive, and generative AI.

b. Specialised Pathway: Educators in mid-career or advanced roles acquire deeper technical, ethical, and strategic competencies. For instance, they might run pilot programmes using prescriptive AI to offer tailored learning interventions.

c. Leadership Pathway: Institutional leaders focus on governance frameworks, risk management, and aligning AI initiatives with strategic goals.

By explicitly recognizing **how each typol**ogy can manifest at each level, the CFHE aligns better with the multi-faceted reality of HE, where teaching, research, and leadership roles often overlap.

Proposed Enhancements: Acquire Plus, Deepen Plus, Create Plus

To address UNESCO's gaps, the CFHE introduces three additional tiers, Acquire Plus, Deepen Plus, and Create Plus, that reflect HE's distinctive context:

CFHE Tier	**Generative AI**	**Predictive AI**	**Prescriptive AI**
Acquire	- Foundational Skills: Use simple generative tools (e.g., auto-summarisers) to spark class activities or brainstorming.	- Foundational Data Literacy: Explore basic predictive features in LMS analytics (e.g., identifying at-risk students).	- Awareness of Recommendations: Learn what prescriptive systems are (e.g., AI-based tutoring suggestions) and where they might be used.
	- Awareness: Recognise ethical issues (authorship, originality) and cite AI-generated material properly.	- Ethical Context: Understand potential biases if data are incomplete or out-of-date.	- Ethical Context: Discuss student autonomy and consent when an AI "recommends" actions.
Acquire Plus	- Disciplinary Applicability: Apply a basic generative text/image model to your field (e.g., tailoring mass e-mail communication).	- Early Analytics: Experiment with relevant predictive models in a specific discipline (e.g., predictive modelling in nursing or business).	- Practical Exploration: Use a prescriptive tool (e.g., scheduling software or an adaptive assignment recommender) in a pilot.
	- Data Protection: Understand privacy concerns in content generation (e.g., not feeding sensitive info to public models).	- Security Basics: Adopt institutional protocols for safe handling of sensitive data.	- Contextual Fit: Evaluate whether prescribed interventions align with course objectives and student agency.
Deepen	- Content Creation: Leverage generative AI to co-design materials with students (e.g., creative writing prompts, discipline-specific simulations).	- Data-Driven Teaching: Refine course designs using predictive analytics (e.g., analysing retention trends across different sections).	- Enhanced Learning Pathways: Use prescriptive analytics to provide targeted academic interventions (e.g., personalised reading lists).

	- Pedagogical Impact: Assess how generative outputs shape critical thinking and engagement.	- Bias Audit: Identify potential biases in training data and correct them, possibly in collaboration with institutional research.	- Ethical Guidance: Outline formal consent protocols for student data usage and proactive transparency about recommendation mechanisms.
Deepen Plus	- Research-Integrated Design: Incorporate generative text or data synthesis in lab/workshop settings.	- Actionable Insights: Collaborate with data scientists or IR offices to develop more accurate predictive models (e.g., risk assessment for specific student populations).	- Cross-Departmental Implementation: Oversee pilot programs where prescriptive AI suggests curriculum changes (e.g., adaptive progression for advanced seminars).
	- Faculty Training: Lead seminars showing colleagues how to embed generative AI responsibly (e.g., prompt engineering, correct citation).	- Institutional Review: Co-lead committees to vet predictive tools for fairness and validity.	- Policy Formation: Advocate for guidelines balancing automated recommendations with instructor autonomy.
Create	- Institutional Prototypes: Develop custom generative AI tools (chatbots, writing assistants) addressing departmental needs.	- Advanced Analytics: Lead or co-lead the design of institutional predictive dashboards (student success, resource allocation).	- Strategic Intervention: Deploy prescriptive systems that offer real-time advice to students or staff (e.g., scheduling, mental health referrals).
	- Innovation Showcase: Demonstrate novel uses of generative AI for pedagogical or research breakthroughs (e.g., automated code generation for a CS class).	- Data Management: Work with IT and institutional leadership on data pipelines that feed advanced models at scale.	- Governance Oversight: Ensure ethical guidelines and compliance are integrated into system design and deployment.
Create Plus	- Rapid Prototyping / Specialised AI: Spearhead campus-wide generative AI initiatives (e.g., discipline-specific writing labs, multilingual chatbots) with minimal in-house coding.	- Institutional Predictive Ecosystems: Guide large-scale analytics projects tracking alumni outcomes, research impact, or financial forecasts.	- Prescriptive Governance: Develop overarching policies on how prescriptive solutions are integrated into academic advising, resource management, or strategic planning.
	- Thought Leadership: Publish or present on generative AI's ethical frontiers, shaping institutional and national dialogues.	- Ethical Audits: Lead committees conducting formal bias and integrity assessments for enterprise-level predictive systems.	- Risk Mitigation: Formulate AI oversight boards and frameworks for continuous improvement, ensuring that algorithmic recommendations maintain alignment with institutional values.

By mapping UNESCO's original tiers to these "Plus" extensions, and explicitly integrating AI typologies, the revised framework offers a more nuanced, scalable set of competencies. It acknowledges the complexity of HE roles, where educators might simultaneously require advanced technical proficiency, leadership acumen, and ethical grounding in different AI functions.

Conclusion

This paper has critically examined UNESCO's AI Competency Framework for Teachers in the context of higher education, highlighting its K–12 orientation and insufficient differentiation of AI typologies as key limitations. Although the original framework provides a valuable ethical foundation, it fails to adequately account for advanced competencies in research, governance, and interdisciplinary collaboration. In response, this study proposes the Comprehensive Competency Framework for Higher Education Educators (CFHE), which introduces "Plus" levels, Acquire Plus, Deepen Plus, and Create Plus, to address heightened demands in learning and teaching, doctoral supervision and institutional leadership. Central to this refinement is the nuanced incorporation of predictive, prescriptive, and generative AI at every tier, underpinned by systematic professional development and robust infrastructural support. Future research might involve longitudinal studies to assess the framework's long-term impact, disciplinary adaptations to accommodate diverse fields, and cross-border collaborations to harmonize ethical and regulatory standards. Ultimately, the goal is to harness AI's transformative potential within higher education while safeguarding academic integrity through an updated, context-sensitive competency model aligned with the evolving leadership dynamics of contemporary universities.

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The Illusion of Learning: AI and Its Impact on Higher Education

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Abstract

The role of artificial intelligence (AI) in higher education has significantly increased; it encompasses crucial benefits like personalised learning experiences, enhanced research efficiency, and skill development. However, this rapid adoption has also raised concerns surrounding ethical implications, behavioural impacts, and the potential to undermine human uniqueness. This narrative overview of the literature suggests investigating the use of AI in higher education, with an emphasis on the problem of the illusion of learning, cognitive impacts, and ethical issues. This idea describes how students hold a facade of productivity, while in reality AI is doing the intellectual work, thus impairing their ability to think critically and creatively.

This study uses secondary data analysis to examine the cognitive advantages of AI, like improved memory retention and task simplification, as well as its disadvantages, such as decreased creativity, engagement, and dependency. Examining the effects of AI on cognitive processes and intellectual property, it addresses behavioural hazards, biases, and academic integrity. To balance AI's potential with its ethical and intellectual underpinnings, the research proposes frameworks that synthesise concepts from behavioural science and literature to encourage mindful AI use. It adds to the discourse on educational policy and tactics for encouraging reflective behaviours and human creativity.

Keywords*:* Artificial Intelligence (AI), Higher Education, AI in education (AIED), Cognitive Impacts, Ethical Implications

Introduction

Technologies like big data, cloud computing, neural networks, and machine learning have observed a steep rise, which has paved the way for Artificial Intelligence (AI) to simulate human intelligence (Zhai et al., 2021). Copeland (2025) refers to AI as a digital computer or a computer-controlled robot and its ability to perform tasks associated with and executed by intelligent beings. AI, a transformative force across various sectors, can perceive, recognize, learn, react, and solve problems.

AI in education (AIED) and AI literacy have emerged as key topics in policy debates, questioning the role of technology in classrooms. The concept of AIED originates from Skinner's 'teaching machine' of

the 1950s, which aimed to personalise learning in a manner similar to a private tutor. Following the same timeline was Pask's adaptive teaching machine, SAKI, which tailored tasks to the learners' performance. In 1970, Carbonell's SCHOLAR employed AI techniques to generate individualized responses, laying the foundation for modern student-focused AI systems (Holmes & Tuomi, 2022). Thus, AIED has expanded and evolved over the years, linking fields like computer-supported collaborative learning, learning analytics, and educational data mining. Developmental and sociocultural learning are newer focuses with AI's application now, including education administration, teacher support, and innovative teaching methods (Holmes & Tuomi, 2022).

Revolutionizing workplaces, AI is said to be currently leading the fourth industrial revolution, including the field of education (Zhai et al., 2021). The map attached below underscores global trends of AI adoption in higher education. It uses a yellow-to-red gradient to represent the intensity of integration. Countries like China, Canada, and Japan, in deep read, lead in AI adoption. However, India and Brazil, highlighted in orange, show moderate levels, while Australia, coloured in yellow, reflects low integration. Limited resources in parts of Africa and Asia highlight the digital divide in AI adoption (Khan et al., 2025).

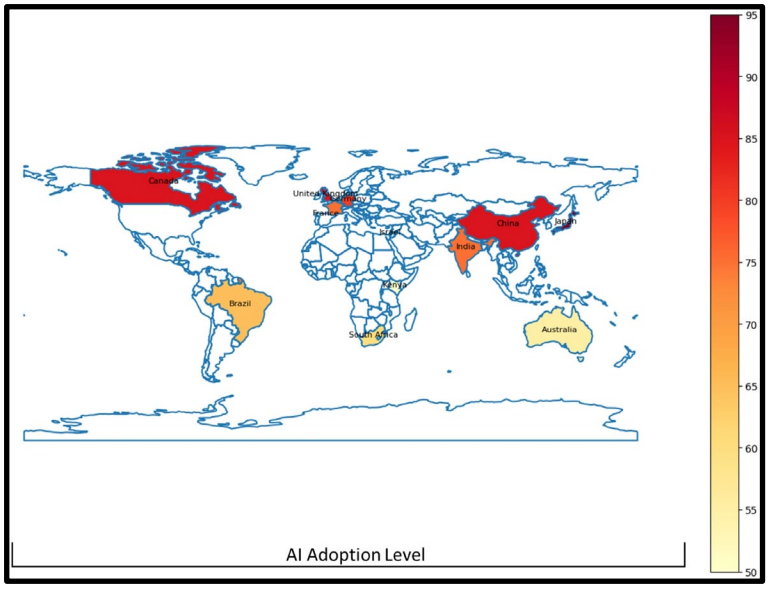

Figure 1: AI Adoption Level (Khan et al., 2025)

Adding strategic value in the education sector, AI claims to ease the burden on teachers and students while offering effective learning experiences. It aligns with educational reforms namely digitization of resources, gamification, and personalized learning. AI-powered systems, like Intelligent Tutoring Systems (ITS), are key examples of leveraging AI to create individualised learning environments. ITSs personalise and streamline learning by monitoring student input, delivering tasks, and providing timely feedback, thus redefining the role of teachers and reimagining traditional schooling (Zhai et al., 2021).

Simply put, AI is no longer science fiction; it's increasingly shaping our daily lives and transforms industries. Its inclusion in higher education, however, has so far been limited, especially outside the STEM fields. Southworth et al. (2023) argue that AI literacy should be a minimum learning outcome for all students, preparing them for the future job market by equipping them with the skills necessary to thrive in an AI-driven world. Incorporating AI into the curriculum allows all students to gain essential knowledge and skills. It empowers them to navigate both personal and professional tasks, making them more competitive in a workforce increasingly shaped by AI. As AI becomes more prevalent, students with a stronger understanding will have a distinct advantage and learning about AI opens up new career opportunities and pathways to workforce readiness (Southworth et al., 2023).

While AI holds great potential in higher education, including chatbots and others, it also raises concerns about misuse, such as plagiarism or other unethical practices. King (2023) points out the growing sophistication of AI-generated content challenges the traditional concept of originality, making it harder to determine whether work is genuinely crated by a human or generated by a machine. This brings into question the importance of attribution and the value of originality in the digital age, urging us to

reconsider how we handle academic integrity (King, 2023). Thus, it is critical to implement policies, regulations, and education on ethical AI use to ensure its responsible application in education.

Therefore, the authors focus on addressing the discourse on the integration of AI in higher education across research, academia, and workplace sectors. It seeks to fill gaps in existing studies by proposing actionable strategies for mindful AI thereby fostering critical thinking, creativity, and ethical engagement.

Methodology

This study utilises a narrative literature review methodology to explore the cognitive and ethical implications of mindful use of AI in higher education. The narrative review method was chosen to provide a comprehensive synthesis of existing research, allowing for the exploration of behavioral science perspectives on AI usage.

Literature was identified through SpringerLink, PubMed, ScienceDirect, and Google Scholar. The search terms combined results from some of the following search terms: "AI in higher education," "cognitive consequences of using AI," "mindful use of AI," and "behavioral science and AI, and it is focused on peer-reviewed studies, books, and policy reports. For cognitive implications, literature from the past decade (2011 onward) was prioritised, while for mindful use of AI, older studies were included, drawing from mindfulness research dating back to the 1990s to capture long-standing strategies and frameworks. Reference sections of identified papers were also utilised to broaden the scope of analysis.

The analysis involved identifying the important themes which have been focused in detail below:

Cognitive Implications of AI

The integration of AI in higher education can have significant cognitive consequences, affecting the way of learning processes and intellectual development amongst students in the long run. One of the most significant concerns coming up within this context is that of the 'illusion of learning', whereby the students tend to overestimate their comprehension owing to the ease and accessibility of AI-driven help. This can be understood in behavioural science via the concept of 'cognitive ease', saying that people are more likely to process information they can easily engage with (Kahneman, 2011). By offering fast and concise responses, AI tools induce an experience of productivity lowering deeper processing and meaningful engagement with learning (Popenici & Kerr, 2017).

It also encourages cognitive offloading, thereby enabling students to offload their critical executive functions—solving problems, analysing information—which at a long-term shall affect independent critical thinking skills (Risko & Gilbert, 2016). Studies suggest that this overdependence diminishes cognitive load, reducing resilience, and impairing their capacity to independently undertake complex academic tasks (Zhai et al., 2024). From a behavioural perspective, reliance on AI heuristics constrains students' practical engagement of synthesis and evaluation that promote intellectual flexibility (Risko & Gilbert, 2016; Zhai et al., 2024).

Indirect effects may include acts of amplifying user preferences cum generating echo chambers reducing exposure to other perspectives (Bond et al., 2024). Such selective exposure corresponds to confirmation bias (inclination to search, interpret, favour, and recall information confirming one's prior beliefs)—biases that inhibit critical thinking and cognitive diversity (Nickerson, 1998). Particularly in higher education, this kind of cognitive narrowing is problematic since intellectual growth relies on exposure to a variety of perspectives (Popenici & Kerr, 2017).

An equally relevant implication is the loss of intellectual ownership. According to self-determination theory, autonomy is an important element of intrinsic motivation and cognitive engagement (Deci & Ryan, 2000). But when students use AI tools for truly intellectual endeavors, such as writing essays or analyzing data, they may lose ownership of their work. The expectation of constant assistance can reduce their motivation to actively engage with learning resources, as well as the pleasure of achieving academic objectives on their own (Risko & Gilbert, 2016; Bond et al., 2024).

Moreover, the efficient functioning of AI may influence the creative thinking process. The risks associated with overreliance on AI is linked to 'automation bias', which refers to the tendency of people to default to preferred automated suggestions over their own judgments (Mosier & Skitka, 1996). When

students simply accept AI ideas, they risk the homogenization of thought thereby hampering uniqueness and reducing creativity (Bond et al., 2024). This creates concern for higher education environment that champions creativity; originality linked to innovation, critical problem-solving, and intellectual diversity—all fundamentals to academic integrity and social change (Hall, 2015, Popenici & Kerr, 2017). Such cognitive implications point to why a careful balance of AI in higher education is a necessity.

Cognitive Implications of AI	
Illusion of Learning	Students tend to overestimate their comprehension owing to the ease and accessibility of AI-driven help (Kahneman, 2011).
Cognitive Ease	People are more likely to process information they can easily engage with (Kahneman, 2011).
Cognitive Offloading	Enabling the students to offload a lot of their critical cognitive work—solving problems, analysing information—to some external system. In the shorter period of time, cognitive offloading reduces mental effort, but at a long-term cost of independent critical thinking skills (Risko & Gilbert, 2016).
Echo Chambers	Reduces exposure to other viewpoints (Bond et al., 2024). Such selective exposure corresponds to confirmation bias.
Confirmation Bias	The inclination to search for, interpret, favour, and recall information in a way that confirms their prior beliefs—biases that inhibit critical thinking and cognitive diversity (Nickerson, 1998).
Intellectual Ownership	When students use AI tools for truly intellectual endeavors, such as writing essays or analyzing data, they may lose ownership of their work (Risko & Gilbert, 2016; Bond *et al.*, 2024).
Automation Bias	The tendency of people to default to preferred automated suggestions over their own judgments (Mosier & Skitka, 1996). They risk the homogenization of thought, where standard solutions are accepted and innovative discoveries are avoided (Bond *et al.*, 2024).

Table 1: Cognitive Implications of AI. Major cognitive functional processes engaged and impacted with the use of AI are presented.

Ethical Issues

AI tools have significantly revolutionized the educational sector; however, they have also proved to be a threat to academic integrity. Current research reveals a mix of scepticism and enthusiasm regarding its application in higher education. On one hand, these tools are game changers with their innovative approaches to enhance student engagement and learning, while on the other, they are criticised for their disruptive technologies, posing critical ethical challenges. The United Nations Educational, Scientific, and Cultural Organisation (UNESCO) has highlighted the issues of privacy, accessibility, and bias and recommends equitable and ethical regulations of AI use within education (Mumtaz et al., 2024).

Admission and grading processes employing biased algorithms have devastating effects on students. AI tools are also contributing to the displacement of human educators, which further raises questions about transparency and accountability since AI's rapid integration into decision-making processes (Navigating the Ethical Challenges of Artificial Intelligence in Higher Education: An Analysis of Seven Global AI Ethics Policies, 2023). Responsible AI deployment in higher education requires stakeholders to work together and address these challenges to maximise its benefits. Gender bias should also be avoided in algorithm development, learning data sets, and AI decision-making. The highest quality of data collection, labeling, and algorithm documentation should be ensured for traceability and openness. Transparent and answerable AI systems may reduce the adverse effects of displacement. To further combat displacement and deployment, universities should study the ethical, social, and policy implications of AI (Navigating the Ethical Challenges of Artificial Intelligence in Higher Education: An Analysis of Seven Global AI Ethics Policies, 2023).

Other issues include accountability, human oversight, transparency, and inclusivity. Student assignments rarely reflect individual knowledge with no moral and legal accountability for AI-related wrongdoings, demanding the urgency of robust national AI education policy guidelines (Khan et al., 2025). Tools like ChatGPT-4o, released for free in May 2024, have enabled students to engage in academic dishonesty allowing students to generate assignments and answers effortlessly making it more difficult to teachers to assess them. This suggests the need to revise the definition of plagiarism to include the use of AI-generated content to reinforce that using AIT without appropriate attribution is academic dishonesty (Mumtaz et al., 2024).

Higher education is also facing challenges with data privacy and the digital divide, which need to be combatted urgently. Lack of data privacy can be mitigated by including advanced encryption, secure storage protocols, as well as adherence to privacy regulations. The digital divide and access inequality can be checked by investing in accessible AI-driven learning environments and supporting equitable access for all students, including those with disabilities (Khan et al., 2025)

It is essential that educators encourage the mindful use of AI in ways that enhance human thinking instead of displacing it—so that students learn to think critically, creatively, and independently as they prepare for success in both the classroom and the workforce.

Mindful Use of AI

The concept of mindful AI integration remains an underexplored but crucial topic in higher education. AI tools are rapidly being used in academia, research, and employment; their unchecked use risks eroding core human skills like critical thinking, creativity, and intellectual ownership. Behavioral studies suggest that over-reliance on technology can lead to "brain futility," a phenomenon where individuals lose the ability to generate original ideas or solutions due to cognitive offloading (Risko & Gilbert, 2016). This paper addresses the urgent need for balance, emphasizing that the integration of AI must complement rather than replace human intelligence.

In academia, AI tools like Grammarly and ChatGPT are no longer used solely for language refinement but increasingly for generating entire pieces of academic work. This shift raises significant concerns about originality and intellectual effort, as students often bypass critical thinking and rely entirely on AI-generated content. Turnitin and similar platforms assert their ability to detect AI-generated content, yet the reliability of such detection remains a subject of scrutiny. The proliferation of advanced paraphrasing tools further complicates this issue, enabling users to evade detection mechanisms and raising significant ethical concerns. While these tools may enhance efficiency, they also obscure the boundaries of originality and intellectual effort, ultimately posing a challenge to academic integrity and undermining the fundamental principles of education.

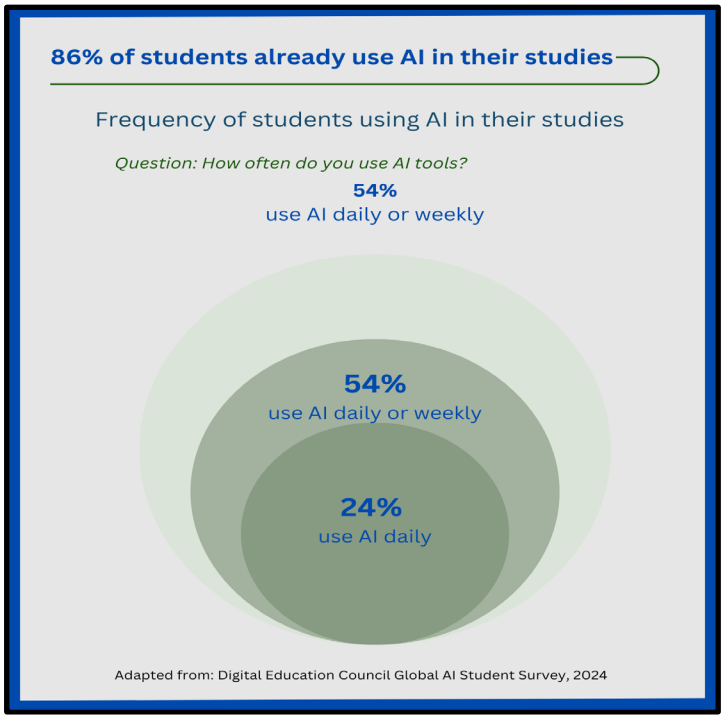

Figure 2: Percentage of AI adoption by students (Digital Education Council Global AI Student Survey 2024)

Similarly, in research, AI accelerates literature reviews and data analysis, but, as noted in the cognitive impacts, over-reliance can diminish critical thinking and deeper intellectual engagement. As reflected in Figure 2: AI Adoption in Research, the growing influence of industry in AI research is evident, with 68.9% of AI PhD graduates employed in the private sector by 2020, compared to 21% in 1999 (Ahmed et al., 2023). This trend shows how the private sector is not only adopting AI but also driving research, necessitating a balanced approach in academia to prepare students for ethical and critical engagement in this evolving space.

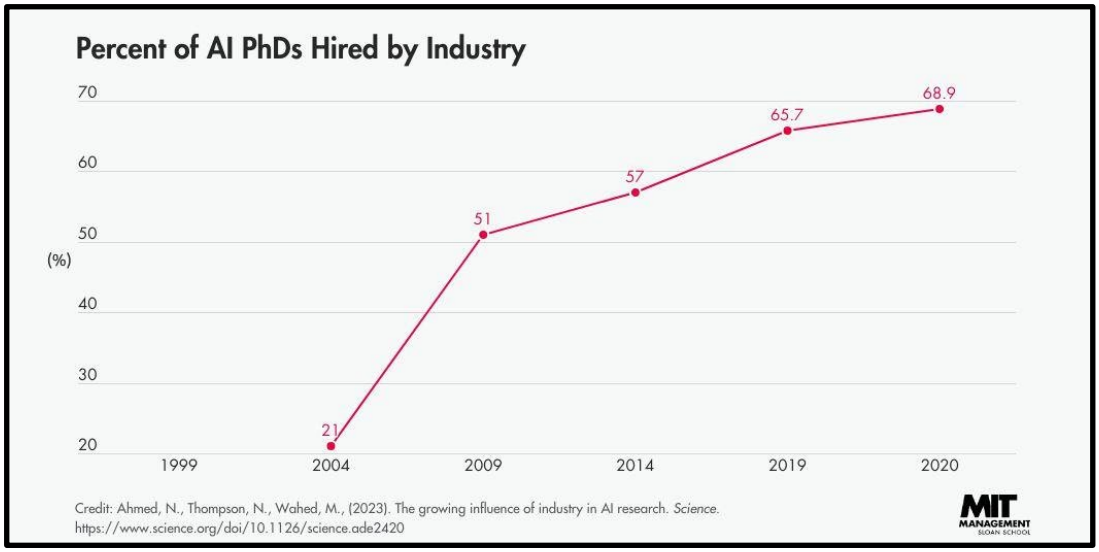

Figure 3: AI Adoption in Research (Study: Industry Now Dominates AI Research | MIT Sloan, 2023)

In employment, the rapid adoption of AI is evident. Figure 3 shows that the percentage of organizations using AI in at least one business function rose from 47% in 2017 to 72% in 2024 (Singla et al., 2024). Graduates accustomed to using AI in their studies are likely to carry this reliance into professional environments. While AI offers opportunities for automation and efficiency, its unchecked use could hinder innovation and promote dependency.

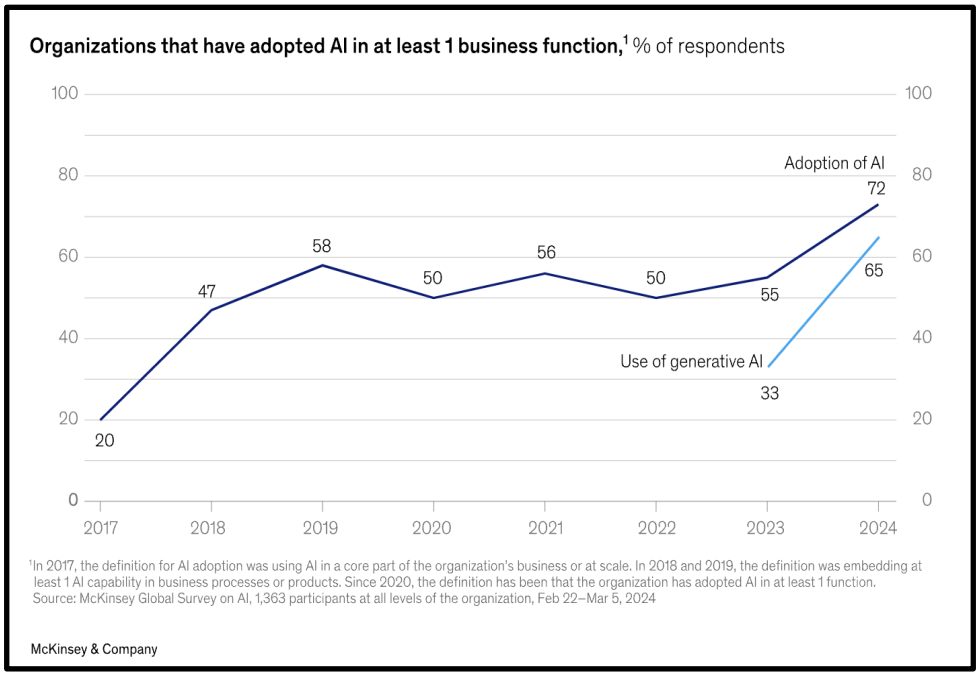

Figure 4: Rate of Adoption of AI in Organizations (Singla et al., 2024)

Given these trends, the mindful integration of artificial intelligence (AI) into higher education is critical to addressing the cognitive and ethical challenges associated with its use. The behavioural science principles mentioned in Table 2 below help in how to enable users to experience AI in a legitimate manner that still allows cognitive processes, critical thinking, and ethical frameworks to function. Rooted in reflective practices and intentional engagement, however, users can shield themselves from the dangers of over-reliance, shallow learning, and reduced creativity.

Strategies for Mindful Use of AI	
Metacognitive Awareness	Reflecting about their thinking helps students critically evaluate AI-generated content, along with identifying effective uses of AI in learning. Strategies like journaling and self-questioning enhance deliberate thinking and learning outcomes (Schraw & Dennison, 1994)
Critical Interaction with AI	Students must learn to challenge the truth of the information generated by AI, referencing it against other data sources and applying their own logic to the content. Involving students in the learning process enhances retention and understanding and reduces their reliance on AI tools (Bonwell & Eison, 1991).
Goal Setting	Behavioural science suggests that having well-defined goals improves focus and minimizes distractions.

Self-Regulation	Students are advised to use AI tools for a specific target, like improving passages or checking grammar, instead of outsourcing an entire task. Limited AI engagement ensures that students are able to maintain ownership of their creative process and focus on maintaining a balance.
Digital Literacy	Equipping students with the knowledge of what AI can and cannot do is critical. Behavioural research is essential for humans to understand how AI algorithms work, including their biases and their possible inaccuracy. It allows students to utilize these game-changing tools responsibly and strategically while mitigating the downsides of misinformation and intellectual laziness.
Nudge-based Behaviour Interventions	Emphasizes the role of passive environmental cues within the decision-making framework that guide behaviours without restricting your choices. For example, universities can create educational platforms that require students to validate outputs generated by AI or motivate brainstorming without the role of AI. With these nudges, students are "pushed" to avoid endorsing poor academic practice and to reduce their tendency to overuse AI tools (Thaler & Sunstein, 2008).
Growth Mindset	AI integration can prevent students from treating them like shortcuts to avoid overcomplicating knowledge. A growth mindset—the idea that abilities can be developed through hard work and dedication—fits particularly well with one that emphasizes resilience and learning. Advising students to consider AI a tool that only supplements their creative and critical thinking processes promotes a healthy use of technology.

Table 2: Strategies for Mindful Use of AI. Varying strategies for mindful use of AI across areas like research, academia, and the workplace within higher education are presented.

Integrating these strategies alongside educational systems can enable the use of AI to facilitate better experiences for students while avoiding cognitive and ethical pitfalls. Thoughtful use of AI not only protects the core of education but also harnesses the skills of critical, creative, and independent thinking that we will need in a more automated future.

Conclusion

The integration of AI into higher education offers immense opportunities, enhancing learning through personalization, accessibility, and operational efficiency. However, it also poses challenges, including cognitive offloading, reduced critical thinking, and ethical concerns such as data privacy and bias. To harness AI's potential while addressing these risks, institutions must foster critical evaluation, metacognitive skills, and mindful technology use. Policymakers should ensure equitable, transparent AI deployment to protect privacy and inclusivity. Ultimately, AI should complement, not replace, human intelligence, enabling a balanced approach that empowers students and educators, fostering an innovative and impactful educational ecosystem in an increasingly digital world.

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AI and Education Governance: A Case of Strathmore University in Kenya

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Abstract

This article covers the intersection of Artificial Intelligence (AI) and education governance. It highlights challenges to traditional education practices caused by AI and best approaches to address them. The article analyses the role of AI governance frameworks in guiding ethical, transparent, efficient and effective use of AI tools within universities. It traces the different governance approaches applied globally, the process of building and assessing an AI governance framework and thereafter applies one of the frameworks to a university in the south, Strathmore University. The article underscores the importance of having a clear, intentional and collaborative approach in the adoption of AI within education.

Key Words: Artificial Intelligence (AI), AI Governance, AI Governance Framework, Ethical AI Use, Higher Education AI Policy

Introduction

The concepts of artificial intelligence and governance

Artificial intelligence (AI) is the simulation of human intelligence in machines that are designed to think and act like humans. This is done through algorithms and models that enable computers to learn from data, make predictions or decisions based on the said data (Chan & Colloton, 2024). There are different systems used to train such models for instance supervised learning, unsupervised learning, deep learning, transfer learning and reinforcement learning. Example of AI tools: ChatGPT with its different

versions, Bing, Co-Pilot integrated within Microsoft, Gemini, Grok AI, Deep Seek R1 etc. Generative AI is designed to create new content or outputs based on the input it receives, and its learned understanding of the data provided to the models (Shah, 2023). Unlike artificial narrow intelligence (ANI), which is designed to perform a specific task, Artificial General Intelligence (AGI) is designed to perform multiple tasks and generalize knowledge across different domains (Chan, 2023).

Governance and by extension, corporate governance is maximization of shareholders wealth and/or welfare of all stakeholders in the company, i.e. company's success. When applied to universities, it can imply maximization of the university constituents' welfare and ensuring that a university attains its goals. It encompasses the rules, procedures, practices, and processes by which an education institution is directed and controlled. There are many theories to corporate governance: legal view (focus on fulfilling letter of the law); class hegemony and managerial hegemony (insist on perpetuating existing power dynamics); organizational economics approach (the boards role is to control managerial abuse of power); resource dependency theory (outside or non-executive directors have a role to facilitate access to funds and resources); agency theory (aligns interests of managers with stakeholders); stakeholder theory (making the voices of the stakeholders heard and attended to); competing approach of stakeholder theory and stakeholder values. The formulation and implementation of AI frameworks may follow one, or some of the corporate governance approaches.

Artificial intelligence and governance

AI governance refers to the measures and systematic methods designed to guide and oversee AI development and applications. It ensures that AI is aligned with ethical principles and the values of society. This includes laws, or any guidelines that direct both the creators and the users of AI (Hassani, 2024). Globally, only 20% of universities have an AI governance framework (Lee, 2024), with the percentage being even lower in the African university context. AI has become pervasive in universities and university dons, management and other stakeholders need to adopt a uniform and consistent approach to ensure they maximize the potential of AI and at the same time minimize misuse and associated risks. AI governance is a shared societal responsibility that requires widespread understanding of its principles, challenges, and implications (AIGN, 2024).

An AI governance framework provides the link between values, ethical principles, and application of AI. There are different approaches in Artificial intelligence governance. Some have considered AI governance using a layered approach. Gasser and Almeida (2017) recognize the social and legal layer, the ethical layer (criteria and ethical principles), and the technical layer (data governance, algorithm accountability and standards). Shneiderman (2020) identifies team layer (engineering principles within teams), organization (safety culture), and industry aspects (independent oversight and trustworthy certification) in conceptualization AI governance. Brendel et. Al (2021) focuses on an overall management approach in AI governance by conceiving AI governance at the strategic, tactical, and operational management decision-making levels. Separately, Mäntymäki et. Al (2022) uses a different layered approach at three levels: environmental, organizational and AI system layers. The environmental level constitutes hard law, principles, and guidelines plus stakeholder pressure. The organizational level is focused on strategic and value alignment with communication and engagement back and forth with the environmental layer. At the level of the AI system, focus is on AI system design, algorithm design, risk and impact management, data operations, development operations, accountability, transparency and contestation and compliance with regulations (Mäntymäki, Minkkinen, Birkstedt, & Viljanen, 2022).

AI governance can have many parameters: decision making, board oversight, AI obligations, risk management, intellectual property (IP) rights, data protection, consumer and worker protection, cybersecurity (Freshfields, 2024). Additionally, AI principles and AI system life cycle (OECD) (Hassani, 2024), focus on hierarchy (from the first layer, AI values, then human behaviour, mechanisms, institutional structures, policy and regulations, governance areas) (Marwala, 2024).

AI governance can be deployed or used in three different ways, informal, ad hoc, and formal. Informal use refers to using AI based on the values and principles of the organization, for instance those suggested by OECD, United Kingdom, and Japan. Ad hoc governance involves the development of specific policies and procedures for AI development and use (Strathmore University approach of

developing broad guidelines for faculty and students). Formal governance which includes development of a comprehensive AI framework together with best practices including health score metrics, automated monitoring, custom metrics and audits (Mucci & Stryker, 2024) (IBM company approach).

Process of building and assessing an AI governance framework

The AI governance framework needs a buy-in of all constituents within a university. This implies there has to be constant communication and data sharing from planning and design of the AI framework, data collection and processing, model building and interpretation (of the actual framework), verification and validation, deployment and its operation and monitoring (Mäntymäki, Minkkinen, Birkstedt, & Viljanen, 2022). This should cut across all university operations from teaching and learning, research, community service and support services (e.g. administration). Depending on the amount of resources available, extent of knowledge and training on and use of AI, availability of resources and technologies. The AI governance framework needs deployment in ways that will ensure a university maximizes the attainment of its goals, mission, and vision. Also depending on the structures, processes and commitment of agencies, guidelines may be developed to encourage open dialogue and monitor AI use.

The assessment of the AI governance framework in education institutions should consider as much as possible, AI maturity assessment (how mature is the institution in the use of AI?), what essentials faculty and students need, the necessary essentials for university administrators and support staff and for the board of management or the necessary governing council.

AI use in education has to follow the principles of safety, security, resilience (especially as regards data); explainable and interpretability (in relation to the AI algorithm); privacy-enhanced, fair with minimum bias (which relates to the data that is used to train it, including synthetic data that it later generates); and transparency (i.e. one can explain the reasoning process) and accountability (for the user, the programmer).

Artificial intelligence and education governance

AI education policy framework is different from an AI governance framework, which is broader. The AI policy framework is narrower and may be made up of: governance dimension (general clauses about senior management roles when certain conditions happen), pedagogical dimension (how assessment will be carried out by lecturers and development of competencies) and operational dimension (how teaching and learning will use AI and how it will be monitored).

There are a few frameworks for the integration of AI and education governance. These include: AIGA AI Governance framework, Schools in Australia approach, big ten universities approach, Lee (2024) approach and Restack approach. The components that constitute the AIGA AI governance framework are AI system, data operations, risks and impact, transparency-explainability-contestability (TEC), fairness of AI decisions, development and operations, compliance and accountability and ownership structure (AI-Levate, 2025). When applied in education contexts, the AIGA AI framework examines ways of ensuring algorithms and models are transparent and minimize bias. It also ensures identification and mitigation of risks, while holding specific people within an institution accountable.

The big ten universities approach was applied by Wu, Zhang and Carroll (2024) and was developed after examining the practices in the big ten universities in America. The conclusion was the AI governance framework consisted of data policy and enterprise management, AI centre (responsible for AI use), learning units (which included faculty, schools and other academic departments), community discussions on AI use, types of usage allowed (for instance whether AI was prohibited totally, or was allowed with specific advisory notes, or flexible and Socratic). The whole framework was based on the trustworthiness of AI which is connected to the principles of AI use. Schools in Australia developed an AI framework to be used in Schools, i.e. basic education institutions. The focus was on the principles of AI use in the context of Generative AI. The principles that students, teachers and school community had to adhere to were; privacy, security, transparency in teaching and learning, social well-being, fairness and accountability (Australian Framework for Generative Artificial Intelligence in Schools, 2023). Restack used a simplified AI framework with three elements: ethical guidelines, community engagement, and educational resources. This was applied in the context of academia.

From the above explanations, it is evident that AI frameworks in education governance are related to who they are being used or deployed. The AI education governance framework may at times include the ethics framework. The ethics framework in this case will consist of the ethical foundation in the use of AI (e.g. will AI be applied from a deontological perspective, consequentialist or virtue foundation), the aims and purpose of AI use, principles of ethical AI use, users/agencies that should abide by the different AI rules and regulations, which at times needs a consideration of roles and responsibilities (ethics of management) and areas of application.

An overview of Kenya's AI environment

Despite a widespread use of AI across Africa, the continent is still ranking as the least globally in AI index assessment (Akello, 2022). The index from Oxford insights places a few African countries at top 100 with Kenya featuring at 92 as of 2024 report (Oxford Insights, 2024). The index explores the technological sector, data and government infrastructure as key pillars to AI readiness. Under the pillars, only the Data Protection Act, 2019 is the only established law that governs the information and data processing in the use of AI systems (A.B. Patel & Patel LLP, 2021). There is still a gap to be filled in the rush to adapt and ensure meaningful application of in education sector. Currently, the Government of Kenya is working on a draft Strategy on AI 2025-2030 with an aim to promote and regulate the use of AI across the country, with Education as a priority sector (Ministry of ICT and the Digital Economy , 2025). Institutions have however taken steps to be ahead of the curve by adopting and implementing AI governance framework with the best global practices and national standards, Strathmore University as case in point as discussed in this paper.

University AI Governance Framework in Africa: Case of Strathmore University.

AI has been deployed on an Ad hoc basis within Strathmore University, in Nairobi Kenya. Mantmayaki's (2022) approach provides a way to understand the overall AI governance framework at Strathmore University. At the environmental level, AI use is aligned to existing Kenyan and international laws including the Data Protection Act, and appropriate principles and guidelines for AI use are issued. Strathmore University's AI guidelines align with an overarching Technology Enhanced Learning (TEL) Policy, which promotes innovative, ethical, and learner-centred integration of technology in education (TEL Policy, 2020). The AI guidelines, released early 2025, ensure AI technologies are utilized in ways that enhance teaching and learning while maintaining academic integrity.

At the organizational level, and specifically in relation to teaching and learning, focus is given on value alignment with the core principles of the university. The AI system level is applied loosely by insisting on clarity on where and how AI has been used and the user taking charge of AI use (i.e. transparency and accountability). Students are required to acknowledge any use of AI tools in their academic submissions and adhere to the regulations outlined by their instructors. Unauthorized use is categorized as academic dishonesty and is subject to penalties. Faculty must clearly state the extent to which AI is permitted in their course outlines and require students to submit details of AI-generated outputs when necessary (Strathmore University, 2025B).The Centre for Teaching Excellence (CTE) provides oversight in relation to AI guidelines and training in line with existing IP and data protection regulations. These trainings aim to familiarize educators with AI advancements and equip them with skills to incorporate these tools into their teaching practices. An additional internal AI resource page is provided as a reference point for faculty and students (Strathmore University, 2025A).

In design, planning and deployment of AI governance framework, the university brings together management, faculty, and IT personnel to oversee AI integration. This collaborative effort ensures that policies and practices are consistently applied across various units. For students, emphasis is on academic integrity, including avoiding plagiarism and ensuring ethical use of AI tools in academic work. Faculty are given detailed protocols to incorporate AI use in their courses, with clear instructions of permitted uses and ways to guide students effectively (Strathmore University 2025A; Strathmore University 2025B). The next steps in the implementation of the AI framework will be to ensure a consistent maturity assessment that keeps abreast of the rapidly evolving AI landscape.

Conclusion

Application of AI in consistent ways in a university requires clarity on how a university wants to deploy AI, construction and implementation of a principle-based AI Education Governance Framework and continuous evaluation and assessment of AI use. A university's mission, values and principles act as a north star to assist in the process of creating an AI governance framework. This is not an easy task but one that each university is required to do to survive in this brave new world.

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Artificial Intelligence: Muddying the Waters of Academic Integrity

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Type of working paper: Practice-inspired working paper

Abstract

The increasing potential of AI in education brings with it challenges, including for the academic integrity of qualifications. This practice-inspired working paper presents an initial review of current JCQ and exam board guidance, with a discussion of what this means for both students and educators in navigating potential AI use in internal assessment in sixth forms and colleges, such as non-examined assessments as part of A Level courses, and coursework-based subjects such as BTEC. AI misuse is discussed in relation to the present lack of valid and reliable detection tools, presenting ethical challenged when raising doubts about learner work. While the variability of what constitutes appropriate and acknowledged AI use highlights a need for nuanced understanding by both educators and students. With the development of more reliable AI detection tools and qualification reform out of the hands of teachers, education on AI in the specific context of formal internal assessments is identified as the most viable approach available to educators at the present time, identifying the need for further research in this area to inform effective policy and practices that could support the academic integrity of these types of assessment.

Key words: Artificial Intelligence (AI), plagiarism, integrity, academic misconduct, assessment

Introduction

Despite heavy focus on A Levels and exams, many subjects offered at post-16 within the UK education system still involve writing coursework. Meanwhile, 'plagiarism is a problem as old as written culture itself' (Landers, 2025). It is a timeless issue that educators have continuously worked to address (Darr, 2019; Tomar, 2022; Drisko, 2023). However, Coccoli et al (2024) highlight that the 'advent of generative artificial intelligence-based tools changed the game' (p.1). The rapid development and availability of generative artificial intelligence (AI) poses significant new challenges for educators to manage the academic integrity of these qualifications. While much research focuses on academic integrity in terms of Higher Education, it is useful to consider how current discourse may apply to those, such as myself, practicing in sixth forms and colleges in the UK. This practice-inspired working paper presents a review of current guidelines from the Joint Council for Qualifications (JCQ) and a number of exam boards, revealing a need for clarity regarding the use of AI in internal assessment, and practical ways that educators can manage this challenge in their practice. Ultimately, it aims to encourage debate and discussion on the matter.

The Need for Clarity on AI Use and Misuse

In 2024, JCQ published guidance for teachers and assessors on the use of AI in assessments, highlighting the need to 'protect the integrity of qualifications' (JCQ, 2024). This guidance outlines the responsibilities of centres, such as updating malpractice and plagiarism policies, and providing learners with information on appropriate use and referencing of AI. It also states the need for centre staff to be

aware of what constitutes malpractice regarding the use of AI in assessments, and the need for appropriate investigation when AI misuse is suspected. While this shows an attempt to provide guidance for educators on AI misuse, what it also highlights is that (with appropriate referencing) there appears to be 'acceptable use' of AI and it is this that needs to be understood. The unreferenced use of AI is clearly misconduct, but there is less clarity on what would constitute appropriate acknowledged use. This is further highlighted by guidance from specific exam boards, which provide additional guidance based on the JCQ publication. For example, OCR offers a list of appropriate uses for AI in the production of A Level Computer Science coursework, such as 'help with initial project concepts', giving specific examples of prints, such as "State 10 ways that I could use power ups in this game" (Cattanach-Chell, 2024). However, for the non-exam assessment (NEA) component of A Level History, Pearson Edexcel (n.d) focuses on clarification of what learners should not use AI tools for, such as to select relevant works, to plan or to write their coursework. However, they also state other acknowledged uses of AI 'may be used when the conditions of the assessment permit the use of the internet and where the learner is able to demonstrate that the work is their own'.

What constitutes appropriate AI use is evidently varied, posing challenges for teachers to navigate the matter with confidence. In some instances, what is deemed acceptable use of AI is aligned with assessment criteria. For example, in A Level History (Edexcel), learners are explicitly assessed on their ability to select sources of information. Therefore, it would not be appropriate for learners to use AI to complete this task, even if it were appropriately acknowledged. Meanwhile, courses such as Criminology (WJEC, 2023) do not allow any AI use within the internal assessments - again, illustrating the variation in acceptability of AI use that teachers must navigate.

Identifying and Responding to AI Use in Assessment

Given this variation in what constitutes use and misuse of AI in internal assessment, there is a challenge for those tasked with assessing work to identify and appropriately respond to both AI use and misuse. Identification and handling of clear AI misuse which has not been acknowledged by students seems straightforward, and aligned with current practices relating to plagiarism. JCQ (2024) provides examples of cases in which academic misconduct through the use of AI has been identified. For example, in a case involving a student of A Level History, a teacher raised concerns about inconsistency in the work of two students. In one instance, the student admitted to using AI tools to create a guideline for their work and had mistakenly submitted the wrong file. In the other, the student admitted to using AI tools to check and generate some of their work. Both cases were deemed malpractice and led to disqualification from the assessed component in the first case, and the entire qualification in the second. In both instances, the learners did not appropriately acknowledge their use of AI. While this seems clear, the key challenge is the initial detection of undeclared AI use. In this example, further investigation is initiated by teacher concern about the inconsistency in writing style. This led to the use of AI detection tools, however the limited validity of such tools is widely documented (Dalalah & Dalalah, 2023; Eke, 2023; Coccoli et al., 2024; Chaka, 2023; Halaweh & Refae, 2024). This includes issues of both under-detection and false detection, with reports of students being unduly hauled in front of plagiarism panels as a result of AI detection scores that the developers of the tools themselves admit is based on likelihood. Plagiarism, at least in terms of existing sources such as websites and journals, is easy to prove. It is simply a case of pulling up the matched source(s) and observing the similarities, whereas the estimation made by AI detection tools 'does not provide materialistic evidence as compared to similarity check tools' (Dalalah & Dalalah, 2023, p.2). With AI detection and investigation, there is no such objectivity. A comparably subjective decision must be made based on the evidence of flawed AI detection tools and other means of investigation, such as comparison of other examples of written work or a student's defence in response to questioning. Thus, it may be argued that while AI poses threats to academic integrity in terms of its potential to facilitate academic misconduct, the investigative process also poses challenges to professional judgement, as 'an unfounded accusation of fraud by a teacher toward a student would be equally serious' (Coccoli et al, 2024, p.1). Similarly, Halawe and El Refae (2024) argue 'it would be unfair to penalize a student after detecting their work as AI generated, especially when the detection tool is inaccurate' (p.189). Thus, Dalalah and Dalalah (2023) urge, 'it is vital to address the concerns regarding false detection of AI generated text and ensure that these models are used in ethical and responsible conduct' (p.1).

The challenge of how to respond to AI use persists, even when its use is permitted and referenced appropriately. JCQ (2024) guidance suggests that depending upon the marking criteria or grade descriptors being applied, the assessor may need to take into account the failure to independently demonstrate their understanding of certain aspects when determining the appropriate mark or grade to be awarded. In an example provided by JCQ (2024), appropriate use of AI is described in a learner's work for the Pearson Level 3 National Extended Diploma in Business, in which a student's work met all Pass, Merit and Distinction criteria, however a Distinction was not awarded, as although AI had been correctly acknowledged and therefore no misconduct was identified, it was deemed that the learner had not independently demonstrated sufficient evidence to meet the criteria and a Merit was awarded. Thus, it seems that while students may not be sanctioned for academic misconduct if AI use is clearly acknowledged, this does suggest that students could, however, be penalised academically. Furthermore, there is broad evidence to support wider potential issues of using AI generated information, even when acknowledged. For example, there are risks of AI compiling phrases from existing sources, leading to inadvertent issues of plagiarism, and the standard of responses are questionable due limitations of the technology itself (Eke, 2023). This raises questions of the value compared to potential detriment of AI in internal assessments, even if teachers and students are able to successfully navigate what is deemed appropriate use.

What Can Educators do?

The evident need to wait for further research and development of AI detection tools is aptly an 'arms race', as the development of new generative tools far outpaces the development of their counterparts. This is out of the hands of educators who face the use of AI as an ever-present challenge that needs just as present attention. Thus, Landers (2025) suggests 'it should be acknowledged from the beginning that the immediate strategy for educators will need to be one of prevention, not detection' (p.84). As a result, potential strategies are considered here, including the potential for legislation, education and policy development.

Some writers have likened AI to 'contract cheating' (Sweeney, 2023; Gaumann & Veale, 2024), the practice of commissioning someone to write a unique assignment on one's behalf. Eke (2023) observes, regarding AI and similar services, 'the general fear is that students as well as researchers can start outsourcing their writing' (p.2). This comparison could provide justification for similar measures to be taken to combat AI misuse, as those used to combat contract cheating. In 2022, the UK government introduced the Skills and Post-16 Education Act, which includes the statement 'it is an offence for a person to provide, or arrange for another person to provide, in commercial circumstances, a relevant service for a student in relation to a relevant assignment', making services that enable contract cheating punishable by law. However, this does not currently apply to the use of AI for such services. However, Eke (2023) reasonably suggests that 'it is not sustainable to ban, reject or dismiss' AI in education (p.2), which is strongly supported by the overwhelming interest from the education sector in utilising AI, including the Department for Education (2025). In response to these challenges, it may also be pertinent to question whether written assignments may remain a valid form of assessment. However, since the Covid-19 pandemic, there have also been calls to review the validity of high stakes examinations as a means for testing academic performance, with questions still being raised, such as 'should we abolish exams?' (The Guardian, 2024). This highlights the need for more widespread review, which, again, is beyond the scope of many educators who face this ever-present challenge and are bound to deliver the courses as defined by their specifications.

Many writers support the use of education itself as a means for navigating both the opportunities and challenges of AI in education and assessment (Eke, 2023; Landers, 2025; Kovari, 2024; Giuliano, 2024; Perkins et al, 2020). Much content (academic and non-academic) on AI frames it as a revolutionary tool for learning. Projects such as those on 'Artificial Learning in Education, Learning and School' (Scottish Parliament, 2024) provide evidence that young people are aware of the potential risks and opportunities posed by AI. In fact, Landers (2025) suggests there is 'a struggle to stay ahead of our own students' understanding and use of AI-based technology' (p.83). However, Eke (2023) argues 'many people in academia; researchers, teachers and students still do not know how to optimally use the system, not to mention using it responsibly' (p.2), and therefore highlights the importance of education. Given the discussion presented here of the need to effectively navigate appropriate uses of AI and understand potential impacts on marks or grades, it is vital for students to understand the

nuances of potential AI use in different educational scenarios. While the call for education is evident, there is limited current research on its implementation. However, insight can be drawn from wider approaches to plagiarism education. For example, Giuliano (2024) reports positive results from a three-part intervention that involved an online plagiarism tutorial, a lecture on plagiarism and a follow up exercise which facilitated application of skills from their learning. Perkins, Gezgin and Roe (2020) also report positive results from an intervention during an English for Academic Purposes courses in an HE setting. Thus, perhaps the most feasible, and therefore the most immediate approach for educators may be similar. However, it is important to highlight that the complexity of what constitutes acceptably AI use in the specific context of internal assessments should be thoroughly addressed in this training, so that learners are given the information required to fully assess their decisions. For example, they must understand that while a certain use of AI may be permissible if references, teachers must consider this in their assessment and thus there may be academic consequences, even if no formal sanctions are incurred.

Finally, it is necessary to consider policies and procedures that may be put in place to support educators. However, Landers (2025) observes 'if the current rate of development persists, we will continue to see companies add increased functionality to their AI tools, making the task of keeping pace exceedingly difficult for policymakers and educators' (p.82). Nonetheless, clear policies and procedures can be beneficial for both staff and students, aiding their understanding of AI use and its implications, as well as processes that must be followed, such as referencing requirements and investigative proceedings. Meanwhile, this policy may also be used to implement further measures that aid the prevention of AI misuse, such as the requirement to submit work in progress, or to participate in a verbal discussion of work to enable a teacher to verify its authenticity (Kovari, 2024).

Conclusion

Overall, this paper seeks to highlight the challenges faced by educators in maintaining the integrity of internal assessment, when faced with the challenges of AI. Even determining whether AI is permissible requires nuanced understanding of its potential uses and relation to assessments within the guidance set out by both JCQ and individual exam boards. Furthermore, educators face issues of detection, with the suggestion that they should rely on prevention methods, such as education. Yet this poses further challenges of subjectivity in raising concerns, due to the lack of valid and reliable objective detection tools that pose their own moral and ethical challenges when used in support of an accusation against a learner. Ultimately, this working paper raises questions which require significant further exploration, whether through practice or research.

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Evaluating Cultural Contextualization in AI-Generated Grammar Questions: A Study of Malaysian Learners for whom English is a Second Language

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Abstract

This working paper investigates the effectiveness of Large Language Models (LLMs) in generating culturally contextualized English grammar questions for Malaysian English as a Second Language (ESL) learners, focusing on Present Perfect (PP) and Present Perfect Continuous (PPC) tenses. By comparing zero-shot versus few-shot prompting strategies across ChatGPT, Claude, and Gemini, we evaluated both the quality of generated questions and their cultural authenticity. The research employed a mixed-methods approach: a qualitative assessment to measure AI-generated questions' cultural authenticity, and a quantitative analysis of 30 Malaysian secondary school students' performance on AI-generated and human-authored questions. Results demonstrate that few-shot prompting significantly improves question quality and cultural relevance, with Claude showing particular promise in incorporating Malaysian contexts. While chi-square analysis ($\chi^2 = 1.26$, $p = 0.262$) revealed students could not consistently distinguish between AI and human-generated questions, their performance varied significantly between the two sources ($\chi^2 = 5.31$, $p = 0.021$), with higher accuracy on human-written questions. These findings suggest both opportunities and challenges in implementing AI-generated materials for ESL instruction while highlighting the importance of careful curation and integration strategies.

Key words: English as a Second Language (ESL), Large Language Models (LLMs), Cultural contextualization, Few-shot prompting

Introduction

Malaysia is a multicultural nation where English serves as a major medium of communication and commerce. Thus, all students are required to learn English as a Second Language (ESL). Influenced by their first languages, Malaysian ESL learners face distinct challenges with English grammar, particularly in areas such as tenses, object pronouns, plurals, auxiliary verbs, prepositions, and articles (Govindarajoo et al., 2022). While educators can manually create practice questions, the volume and variety needed for effective learning often exceed what they can reasonably produce. This challenge is particularly acute in Malaysian classrooms, where students need extensive practice with questions that reflect their cultural context and common grammatical challenges.

Recent advances in Large Language Models (LLMs) offer promising solutions for automated question generation in educational contexts. Studies have demonstrated success in using LLMs to create questions aligned with educational frameworks like Bloom's Taxonomy (Hwang et al., 2023) and in developing diverse question types through prompt engineering (Lee et al., 2023). However, these generic approaches often fall short of addressing the specific needs of students as well as culturally diverse learning environments. Effective practice questions should not only be grammatically accurate but also culturally contextualized (Sultana, 2018) and aligned with learners' experiences (and their level) (Vygotsky, 1987).

Cultural awareness and localization represent critical challenges in LLM applications (Hershcovich et al., 2022). Despite being typically trained on vast multilingual datasets, research shows LLMs remain biased toward English-language and Anglo-centric contexts (Talat et al., 2022; Havaldar et al., 2023), with other cultural backgrounds being underrepresented or misrepresented (Hovy and Yang, 2021; Ahia et al., 2023; Shafayat et al., 2024; Mirza et al., 2024). This bias is particularly problematic in educational applications, where cultural relevance can significantly impact learning outcomes, as seen in Howard and Rodriguez-Minkoff's research (2017). In the Malaysian context, effective English grammar questions should incorporate familiar names, local places and scenarios that reflect students' daily experiences.

Given these challenges, this study aims to:

1. Evaluate the effectiveness of different LLMs (ChatGPT, Claude, and Gemini) in generating culturally contextualized English grammar questions for Malaysian learners through a comparison of zero-shot versus few-shot prompting strategies.
2. Assess the quality and cultural authenticity of AI-generated questions compared to human-authored questions, particularly in their incorporation of Malaysian cultural elements and linguistic considerations.
3. Analyze how student performance varies across different question types, providing insights into the relationship between cultural contextualization and learning effectiveness.

By addressing these aims, this research contributes to our understanding of how LLMs can be effectively leveraged to create culturally appropriate educational materials, while also providing practical insights for educators serving diverse student populations. This research can guide educational institutions in balancing cultural sensitivity and pedagogical effectiveness as they adopt AI-powered solutions.

Methodology

Research Design

This study employed mixed-methods research, combining a quantitative analysis of student performance with a qualitative assessment of the question of cultural authenticity. The research focused on Present Perfect (PP) and Present Perfect Continuous (PPC) tenses, chosen based on their prominence in Malaysian English curricula and documented learning challenges.

Question Generation Process

To generate grammar questions tailored for educators, we used three free and accessible LLMs: **ChatGPT**, **Gemini**, and **Claude**. These models were evaluated using different prompting techniques: **zero-shot prompting** and **few-shot prompting**, allowing us to explore the strengths and limitations of each approach.

- **Zero-shot prompting**: The simplest approach, where the model is given a task description without examples (Brown et al., 2020). For instance, the models were prompted to "generate 10 fill-in-the-blank Present Perfect (PP) and Present Perfect Continuous (PPC) Tenses questions for 14-year-old Malaysian students, along with answers and explanations" (see

Appendix for the exact prompts). However, the responses often contained incorrect answers, ambiguous phrasing, and questions that failed to align with the target grammar.

- **Few-shot prompting**: To improve accuracy, we adopted a few-shot prompting approach in subsequent phases. This involved assigning the LLM a **role** (e.g., "English tutor"), specifying the **target audience** (14-year-old Malaysian students), and including **examples** of high-quality questions with corresponding answers and explanations (Brown et al., 2020). An example we included is:
  *I _____ (wait) the bus for hours! Where is the bus?
- Answer: have been waiting
- Explanation: Present Perfect Continuous Tense is used to emphasize the length of waiting time.*
  We also included reasoning to explain why each question and explanation was effective, which helped guide the LLMs to produce better outputs.

To ensure variety, we explicitly instructed the models to generate a mix of **positive statements**, **negative statements, and interrogatives** for each situation. Detailed prompts and examples are provided in the **Appendix** for reference and reproducibility.

Study Instrument Development

We developed an assessment instrument integrating two components: grammar proficiency assessment and source identification evaluation. The grammar assessment comprised 10 fill-in-the-blank questions balanced between AI-generated (5) and human-authored (5) content. To minimize order bias, we created two versions (A/B) with reversed answer sequences. Each question was followed by a source identification task, asking students to determine whether the question was AI-generated or human-authored. The list of fill-in-the-blank questions is detailed in Table 1 below:

No.	Question	By
1	John _____ (not/sleep) well lately because of his exams.	ChatGPT
2	I _____ (just/finish) my homework. Can I go out now?	Gemini
3	He _____ (drink) 7 cups of coffee this morning.	Human
4	_____ you _____ (watch) the film I recommended yet?	Human
5	We _____ (live) in Kuala Lumpur for five years.	Claude
6	My mum _____ (cook) since early morning, that's why the kitchen is in a mess.	Human
7	I _____ (read) this book for hours, but I still haven't finished it.	Gemini
8	Ranjit and Amarah _____ (know) each other for 10 years. They are best friends.	Human
9	You _____ (not/finish) your homework, so I will not allow you to go to the park.	Human
10	Ahmad _____ (study) more seriously recently. His exam results show improvement.	Claude

Table 1: Assessment Questions Given to Research Participants and its Source Attribution

Participant Selection

The study engaged 30 students from a Malaysian public secondary school, spanning Forms 1-5 (ages 13-17). Participants were randomly allocated between versions A (n=13) and B (n=17) of the assessment instrument.

Data Collection and Analytical Framework

The number of questions correctly identified as AI-generated or human-written was calculated and analysed through the chi-square test and Cramer's V. Participants' answers were evaluated based on the following criteria: correct spelling and the accurate use of PP and PPC tenses. Answers like "hasn't," where the marking scheme specifies "has not," were marked as correct, as they convey the same meaning. Similarly, answers with incorrect use of uppercase or lowercase letters were not penalized. The number of correct answers was then compiled into tables and bar charts for clearer visualization and interpretation, and then analysed through another chi-square test.

Results

Results generated by LLMs

Comparing Zero-shot and Few-shot prompting

Our analysis of zero-shot and few-shot prompting revealed distinct patterns in question generation across different LLMs. Initial zero-shot prompting demonstrated several limitations:

LLM	Key Limitation	Example
ChatGPT	Ambiguous tense acceptance	**Question:** I _____ (work) here since January. **Answer:** have been working **Issue:** Both "have worked" and "have been working" could be correct
Gemini	Insufficient context	**Question:** I _____ (not eat) breakfast yet. **Answer:** haven't eaten **Issue:** Too simple, lacks situational context
Claude	Confusing explanations	**Question:** My grandmother _____ (make) the best rendang in town for as long as I can remember. **Answer:** has made **Explanation:** We use Present Perfect to emphasize the repeated completed action over time, focusing on the result (being known for making the best rendang) rather than the continuous action. **Issue**: Explanation too hard for a 14-year-old student to understand

Table 2: Limitations of Zero-Shot Prompting Across Different LLMs

The implementation of few-shot prompting led to significant improvements in all three LLMs, particularly in question contextualization and explanatory quality. ChatGPT, Claude, and Gemini demonstrated an enhanced ability to generate questions with clearer contextual cues and appropriate difficulty levels for Form 2 students. For example, prompts like "You _____ (use) the computer for hours! It's time to take a break" incorporated both situational context and clear temporal indicators, supported by precise explanations distinguishing between PP and PPC usage. This improvement extended to pedagogical effectiveness, with explanations providing a clearer rationale for correct answers and better alignment with educational standards. However, Gemini occasionally generated off-topic questions reverting to simple past tense instead of PP/PPC. The comparison between zero-shot and few-shot prompting approaches is summarized in Table 3:

Aspect	**Zero-shot**	**Few-shot**
Context Sufficiency	Insufficient context	Sufficient context
Question Type	Mostly positive statements	Consisting of positive statements, negative statements and interrogatives
Answer	Accept both PP and PPC tenses as valid answers despite designating only one as the correct answer	Sufficient context to determine the most appropriate tense
Explanation	Confusing and creating ambiguity	Concise and precise

Table 3: Comparative Analysis of Zero-Shot versus Few-Shot Prompting Approaches

Cultural Context across Different LLMs

Our analysis of cultural contextualization and language standardization revealed two key aspects. In terms of cultural localization, only Claude demonstrated consistent capability in incorporating Malaysian cultural elements. This was evident through its use of local place names (e.g., "We _____ (live) in Kuala Lumpur for five years"), integration of Malaysian names (e.g., "Ahmad _____ (study) more seriously recently"), and generation of contextually relevant scenarios reflecting local student experiences. Regarding language standardization, all LLMs showed inconsistency with UK English conventions, which is the standard in Malaysian education. For instance, ChatGPT and Claude used American spelling variants such as "emphasize" instead of "emphasise," while Gemini employed American variants like "traveled" instead of "travelled." This pattern suggests that while progress has been made in cultural contextualization, language standardization remains a challenge. Table 4 summarizes these findings:

LLM	**Cultural Elements**	**UK English Adherence**
Claude	Yes	No
ChatGPT	No	No
Gemini	No	No

Table 4: Cultural Contextualization and Language Standard Adherence Across LLMs

Comparing Human-written and AI-generated Questions

Source Identification Analysis

Chi-square analysis ($\chi^2 = 1.26$, $p = 0.262$) and Cramer's V (0.065) indicated no significant association between question source and students' ability to identify it correctly. Table 5 presents the detailed analysis:

Observed Frequencies

Response	AI	Human
Correct	108	99
Incorrect	42	51

Expected Frequencies

Response	AI	Human
Correct	103.5	103.5
Incorrect	46.5	46.5

Chi-square test statistic: 1.26 (p value=0.262) Cramer's V: 0.065

Table 5: Chi-Square Analysis of Students' Source Identification Accuracy (N=30)

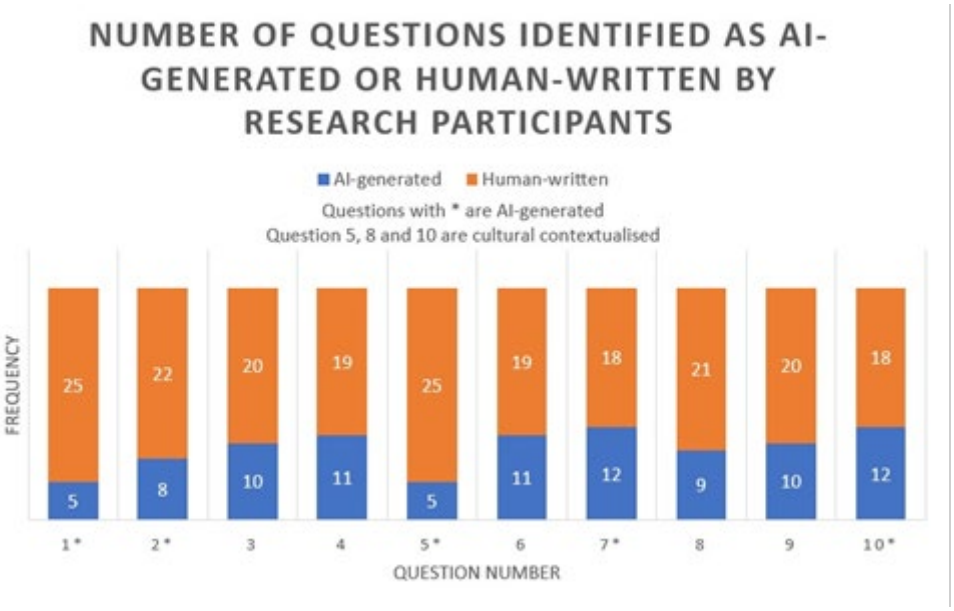

Figure 1: Student Response Distribution for Source Identification Task (N=30)

Figure 1 shows the number of questions identified as AI-generated or human-written by research participants. 2 notable patterns are observed: (1) Questions with cultural context (No. 5) were more likely identified as human-written and (2) Question difficulty appeared to influence source identification, with more challenging questions often attributed to human authors regardless of the actual source.

Performance Analysis

We first analyzed the distribution of correct and incorrect responses across all questions. As shown in Figure 2, question 4 (human-written) achieved the highest accuracy with 20 correct responses, while question 1 (AI-generated) showed the lowest with only 3 correct responses. Notably, culturally contextualized questions (5, 8, and 10) showed varying performance levels, with question 5 (AI-generated) achieving 14 correct responses compared to question 10's (AI-generated) 8 correct responses.

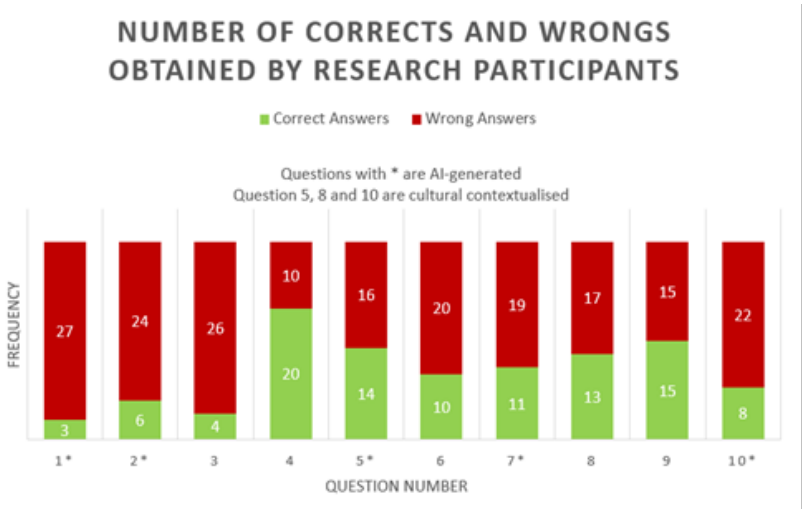

Figure 2: Student Performance Distribution Across AI-Generated and Human-Authored Questions (N=30)

Further statistical analysis revealed significant differences between AI-generated and human-written questions (χ^2 test, $p = 0.021$). Students demonstrated higher accuracy on human-written questions, potentially due to greater familiarity with traditional question-framing patterns. This finding suggests that integrating AI-generated questions could diversify practice materials, potentially broadening students' exposure to different question styles.

Observed Frequencies

Response	AI	Human
Correct	42	62
Incorrect	108	88

Expected Frequencies

Response	AI	Human
Correct	52	52
Incorrect	98	98

Chi-square test statistic: 5.31 (p value=0.021)

Table 6: Chi-Square Analysis of Students' Performance (N=30)

Future Work

Building upon our findings, the pedagogical implications of AI-generated questions warrant further investigation through longitudinal studies. Such research could examine how students adapt to and learn from AI-generated materials over time, as well as establish best practices for integrating these questions with traditional teaching materials. This could include developing specific guidelines for teachers on how to effectively blend AI and human-generated questions in their lesson plans.

Additionally, expanding this research beyond Present Perfect and Present Perfect Continuous tenses to cover other grammar topics would provide a more comprehensive understanding of LLMs' capabilities in ESL education. Future studies could also explore comparative analysis across different Southeast Asian ESL contexts, examining how cultural adaptation strategies might vary across regions. This broader perspective would contribute to developing more robust and versatile approaches to using AI in ESL education across diverse cultural contexts.

Conclusion

This study provides important insights into the potential of LLMs for generating culturally contextualized English grammar questions for Malaysian ESL learners. Our findings demonstrate that few-shot prompting significantly improves the quality and cultural relevance of generated questions, with Claude showing particular promise in incorporating Malaysian contexts. While students could not consistently distinguish between AI and human-generated questions, their performance varied significantly between the two sources, suggesting both opportunities and challenges in implementing AI-generated materials.

The ability of certain LLMs to generate culturally contextualized content through appropriate prompting strategies opens new possibilities for creating localized educational resources efficiently. However, the performance gap between AI and human-generated questions indicates that careful curation and integration strategies are needed. As educational institutions increasingly explore AI solutions, these findings provide valuable guidance for developing culturally sensitive and pedagogically effective materials for ESL instruction.

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Appendix

Zero-shot prompt:

Generate 10 fill-in-the-blanks questions consisting of a mix of Present Perfect Tense and Present Perfect Continuous Tense for a 14-year-old Malaysian student. You are also required to generate answers and explanations for each question.

Few-shot prompt:

You are an English tutor that generates fill-in-the-blank questions related to English grammar, focusing on Present Perfect Tense and Present Perfect Continuous Tense. You generate questions for 14-year-old Malaysian students.

Aim: Questions are generated for students to understand the similarities and differences of Present Perfect Tense and Present Perfect Continuous Tense.

There are a few situations of using Present Perfect Tense and Present Perfect Continuous Tense. Each situation is given an example of a good question, a good answer and a good explanation. For each situation, there can be a positive statement or a negative statement (with a not). Reasons of why it is a good question and and why it is a good explanation are included as guidelines:

Sarah _____ (work) in this company for 10 years.

This is a good question because it shows the students that Present Perfect Tense and Present Perfect Continuous sometimes mean the same thing.

Answer: has worked / has been working (both answers are accepted)

Explanation: Both Present Perfect Tense and Present Perfect Continuous can be used because they mean the same thing with verbs like "work", "live", "study".

This is a good explanation so that students will not be confused when they answer in Present Perfect Tense but the answer and explanation shows Present Perfect Continuous Tense or vice versa. Note that when lack of context is given in the question, both "for" and "since" can be used with Present Perfect Tense and Present Perfect Continuous Tense.

I _____ (wait) the bus for hours! Where is the bus?

This is a good question because the "!" clearly shows that the question wants to emphasize the length of time.

Answer: have been waiting

Explanation: Present Perfect Continuous Tense is used to emphasize the length of waiting time.

This is a good explanation because the explanation includes "waiting time" that relates to the question.

He _____ (drink) 7 cups of coffee this morning.

This is a good question because "7 cups of coffee" shows the amount of action completed.

Answer: has drunk

Explanation: Present Perfect Tense is used to emphasize the number of cups of coffee drunk.

This is a good explanation because the explanation includes the "number of cups of coffee" that relates to the question.

_____ you _____ (watch) the film I recommended yet?

This is a good question because it shows the students that "yet" is often used with Present Perfect Tense. Note that "already" and "ever" are also often used with Present Perfect Tense.

Answer: Have, watched

Explanation: Present Perfect Tense is used with "yet".

This is a good explanation because it is short and precise. Long explanations will only confuse the students.

You _____ (not/finish) your homework, so I will not allow you to go to the park.

This is a good question because "I will not allow you to go to the park" is a result that comes from the action not being completed, which indicates the use of Present Perfect Tense in this situation. When the result comes from the action itself, that indicates the use of Present Perfect Continuous.

Answer: have not finished

Explanation: Present Perfect Tense is used because the result (not allowed to go to the park) comes from the action (finish homework) not being completed.

This is a good explanation because the relationship of the result and the completion of the action is clearly shown. Explanations like 'Present Perfect Tense is used when "you" are not allowed to go to the park because "you" have not finished your homework. ' are not good explanations because the relationship between the result and the completion of the action is not shown clearly.

Alex _____ (wake up) early recently. I wonder what he is up to.

This is a good question because "recently" and "I wonder what he is up to" shows that "waking up" is not a permanent action.

Answer: has been waking up

Explanation: Present Perfect Continuous Tense is used because Alex does not usually wake up early.

This is a good explanation because it is short and precise. It also includes "does not usually wake up early" that relates to the question.

I _____ (be) here for a while.

This is a good question because it shows the students that stative verbs can only be used with Present Perfect Tense.

Answer: have been

Explanation: Present Perfect Tense is used because "be" is a stative verb.

This is a good explanation because it clearly identifies that Present Perfect Tense is used because "be" is a stative verb instead of any other reasons.

Based on the situations and examples of questions given, generate 10 fill-in-the-blanks questions consisting of a mix of Present Perfect Tense and Present Perfect Continuous Tense with as much diversification as possible. Make sure to include all situations and all types of statements. Ensure that the context given in the questions are enough to determine the answer. You are also required to generate answers and explanations for each question. Make sure to determine which situation the question is before generating the explanation. You do not have to explain why it is a good question and explanation.

Twenty-Six Months in the Life of Library and Learning Services: Two responses to generative artificial intelligence

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Type of working paper: practice-inspired working paper

Abstract

Since 2022 and the launch of ChatGPT, Leeds Beckett Library have explored different ways to utilise the new technology. Consideration was needed in the face of new challenges brought by AI, necessitating clear guidance and training. Equally, AI presented opportunities to transform existing patterns of working. This paper discusses Leeds Beckett library's approach through the lens of two projects: as an approach to addressing copyright and AI and in the creation and enhancement of our online content. Together they represent the cautiously optimistic approach towards AI which the library adopted as a whole.

Key words: Artificial Intelligence, Copyright, Prompt Engineering, AI

Introduction

With the launch of ChatGPT in late 2022, discussions around the use of generative artificial intelligence (AI) and its potential opportunities to transform and improve our lives have been at the forefront of almost all areas of life. For Higher Education Institutions (HEIs), the acceleration of generative AI has resulted in a variety of reactions and divergent opinions on their use in education and research. Optimistically, these tools provide the promise of transforming research and learning through the streamlining of administrative tasks and potential of increased discoverability of research resources. However, these potential gains by widespread adoption of these tools need to be weighed against the challenges to traditional cornerstones of academic practices, including academic and research integrity, information literacy, pedagogy, intellectual property, and data security, alongside pressures of continuing decreasing budgets.

HEIs have attempted to mitigate for these challenges through their adoption of policies and production of guidance around acceptable use of generative AI by staff and students in several ways, from outright prohibition to widespread endorsement in all areas of teaching, learning and research (McDonald et al., 2025). Leeds Beckett University has responded with a pragmatic but cautious approach to these challenges, generally allowing for use by students in generating ideas, enhancing understanding, and in seeking guidance for enhancing writing, provided these are used ethically and responsibly and use is acknowledged (Leeds Beckett University, 2024). In addition, the University's AI acceptable use policy provides further guidance for staff about the use of generative AI for business processes such as research, data analysis, and communications, provided that organisational standards to protect data confidentiality and integrity are upheld (Leeds Beckett University, 2025). These principles and policies continue to be revised and developed in tandem with wider sector, governmental and technological guidance and approaches.

Library and Learning Services at Leeds Beckett has been approaching the challenges and opportunities presented by generative AI in a variety of ways. In addition to guidance produced for students and researchers related to responsible use of generative AI, we have been experimenting with how we can use these tools to improve our Service. This paper briefly outlines two approaches to AI use Leeds Beckett Library's work; first, by describing the guidance we provide around artificial intelligence and copyright and intellectual property and second, as a means by which we have experimented with AI to enhance our public facing communications.

Copyright and Artificial Intelligence

Initially, Leeds Beckett's approach towards artificial intelligence use was focused on the impact on academic integrity. Due to the accelerated pace of tools adopting generative AI, our early interim guidance, released in April 2023, was concentrated mainly on acceptable use in assessed work. By late 2023, with AI becoming an increasing mainstay of the academic toolkit, a broader approach was needed. Specifically, previous institutional dialogue had centred primarily on outputs: whether that be the reliability of material produced by AI or the dangers of unlabelled AI-generated work being submitted for assignments, although couched in the need to respect data privacy and in line with research ethics. When it comes to copyright concerns, considering what is inputted into a large language model is crucial.

Under current laws, training a large language model is not covered under any copyright exceptions. That means that any copyrighted material should only be incorporated with the consent of the copyright holder. That is in part the responsibility of the artificial intelligence companies. Equally, some responsibility falls upon users. Most AI companies state that user inputs will become part of the large language model, training it to respond to future queries better. As per their terms and conditions, it is up to users to ensure that copyrighted content isn't being fed into the model through these inputs. The problem gets worse when considering GDPR. As per standard GDPR guidelines, individuals have the right to know what use their sensitive personal data is being put to and to have the ability to remove it at any time. It is generally hard to remove content from an LLM's training set and challenging to see what use any data within that training set is being put to.

To combat these issues, the Leeds Beckett Library Copyright Advice team drafted a guide to artificial intelligence and copyright. The aim was to make sure that academics were fully informed about the risks in using AI, whilst giving them the tools to still utilise the technology. Academics were advised not to put copyrighted content into artificial intelligence platforms which scrape inputs for training. Instead, they should consider using platforms which allow you to opt out of having your data collected and enable those settings. Similarly, they should not put sensitive personal information in inputs: that data being shared with a large language model would be a GDPR breach. The guide sits on the copyright webpage alongside other guides on specific copyright uses. All copyright induction sessions geared towards PhD students embarking upon their thesis contain a slide covering AI, the best practice for using it and the need to list any AI use as part of their ethics declaration.

Alongside raising awareness of the most ethical approach to inputs, Leeds Beckett as an institution has been examining technical solutions to the problem. The institution has a Microsoft CoPilot subscription which is set up as a controlled environment, so inputs are not stored. The Library is also exploring the capabilities of software such as Keenious, which uses the Unpaywall repository of open access journal articles to search for key topics and synthesise between papers. AI itself as a technology is agnostic, neither wholly good nor bad. By encouraging good practice and advising on the risks, the library can equip staff and students to best take advantage of the opportunities it presents.

Creating and improving web content

A practical application of generative AI at Leeds Beckett University has been the testing of AI tools to create content for the library website, as well as improving pre-existing content. Establishing a broad view of AI across the institution enabled library staff to utilise AI for both text and image generation, channelling creativity into tasks whilst remaining pragmatic. Approaching prompt-to-text generation in the first instance, library staff sought to test the effectiveness of AI tools to edit pre-existing text featured on a library webpage ('Critical Thinking'), with the overall goal of reducing the word count. Due to the

text on this page being of Leeds Beckett authorship, as well as containing non-sensitive, informative content, those involved were able to proceed with confidence in the ethical nature of the experiment.

This task involved entering the original webpage text into two AI platforms, ChatGPT (OpenAI) and Claude (Anthropic) and using prompts to improve the content, as well as making it more concise. Two AI platforms were used initially, as this would highlight any major disparities between models and their outputs. However, for consistency, Claude was eventually retired, with ChatGPT taking central focus. For further continuity, and to build confidence in prompt engineering, Dave Birss' CREATE framework (2023) was employed as a prompt writing technique. This framework uses the CREATE acronym (Anyacho, 2023): Character (assigning a specific role to the AI, such as copywriter), Request (asking for a particular task to be carried out by the AI), Examples (guiding the direction of the output through examples for the AI to follow), Adjustments (being aware that further edits may need to be made by the user after the initial output), Type (the format the output should be in, for example a table), and Extras (additional elements users can add to their prompt to enhance it, such as asking the AI tool to confirm what it understands from the prompt it's been given). The CREATE framework granted staff direction in their prompts, as well as ensuring speedy reconstruction of the content that ChatGPT produced, identifying and replacing specific words deemed aggressive or not in line with the tone of the website, for example 'arsenal' and 'packs a punch' (OpenAI ChatGPT, 2023).

In order to shift focus onto the word count, the 'Adjustments' (Anyacho, 2023) step within the CREATE framework was utilised, altering the section of the prompt that initially requested '500 words or less' (Mann, 2023), producing a word count of over 700 (perhaps due to connotation of choice attached to the word 'or'). The reworded prompt instructed ChatGPT to 'write it in 500 words' (2023), a more direct request which resulted in a word count of 531. Additional steps taken in the prompt engineering process illustrate the creativity enacted by Leeds Beckett University, whilst working within a set of rules that sought to steer this creativity rather than stifle it. This work carried out in the field of prompt to text generation was a crucial first step for the library, as the caution displayed at this level set the tone for future testing, including trials of the aforementioned research recommendation software, Keenious, as well as horizon scanning of other up-and-coming AI tools that might improve user engagement, such as Google NotebookLM.

Whilst planning for a library website refurbishment in 2024, a second experiment was carried out, this time testing the use of AI to generate imagery of a library study space that could be used as a website banner. As with text generation, Leeds Beckett took an innovative yet prudent approach, opting for the use of Adobe Firefly in this instance, since the images used to train the AI are not restricted by copyright (such as stock images owned by Adobe, and those already in the public domain). This second experiment enabled staff to use prompt engineering techniques established in the first phase of testing, but with a focus on visual descriptors rather than voice. Through base level prompt engineering, some initial images were produced, but in order to tailor these to a style more fitting of Leeds Beckett University, the decision was made to use ChatGPT itself as a prompt engineer, both as a timesaving technique and, as with the first experiment, a way of working within a model that channels creativity through a set of parameters. Once several prompts had been cultivated in ChatGPT and entered into Firefly, staff once again used the adjustment step from Birss' CREATE framework to alter the colour of the image, tailoring it to the university's signature purple by adding the descriptor 'soft purple lighting' (Mann, 2024) to the prompt.

The results of both experiments were shared at a number of internal events, such as the university's Library Website Group, and the Leeds Beckett Library Conference (2024), but also externally, at a CILIP Webinar, and the Academic Libraries North Conference (2024). This illustrates the university's readiness to engage in conversation with other stakeholders regarding generative AI, sharing their goals, processes, and successes, as well as the difficulties posed by copyright, ethics, and the changing landscape of technology in the UK, as well as just the Higher Education sector.

Next steps

Over the past two years, Leeds Beckett University has taken a largely pragmatic and cautious approach to the use of generative artificial intelligence tools in Library and Learning Services. Alongside a small group of colleagues from across the university, we have been participating in a very small-scale pilot of

Microsoft's Copilot-enhanced apps assist with our work and continue to experiment with other freely available generative AI assisted software. Colleagues in Library Academic Support also continue to provide in-classroom teaching and learning materials around using generative AI responsibly in research and study. Ultimately, we see these tools as what they are; tools; and like all technology, we should think about the task we are trying to accomplish and select the correct tool accordingly. This methodology, stemming in part from the university's own set of institutional values, will serve to help us navigate the next phase of growth for generative AI.

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Marking AI essays as a way of developing critical thinking skills and making informed choices

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Type of working paper: practice-inspired working paper

Abstract

The sudden launch of a large language model AI, ChatGPT by OpenAI in 2022 and its dramatic uptake has sent shockwaves through the academic community. In anecdotal conversations with current and past students (during 2023) it was found that, once trust was established, the vast majority of students (and staff) had adopted this technology and were using AI on a weekly if not daily basis. With such a large uptake I decided to implement coursework, initially with MSc students and then with undergraduates to enable them to use this emerging technology with confidence and criticality. This was done by getting them to use AI to generate written content (with references) and then mark it and give feedback. They also, once the exercise was complete, were required to submit a short reflective essay on their experiences. This gave them skills to be able to assess how the AI was able, to help, where it was unreliable and, in a greater sense, review how an exercise where they were doing the marking, feedback and reflecting on that activity could enhance their own academic journey. Searching the internet for 'marking AI essays' returns a lot of results for how to use AI to mark student essays. This study asks students to mark output generated by AI.

Key words: Reflection, active learning, student led marking, large language models.

Introduction

For many academics, the launch of ChatGPT, the first widely adopted Large Language Model (LLM) AI in 2022, came as a shock (Brown 2024). The ease at which it was able to comprehend human language, process it, draw on data from its training dataset and, from that, generate convincing responses was extraordinary. This unprecedented, unplanned experiment in modifying student behaviour for both research and assessment caught many institutions unawares and sparked a series of reactions. At the university of Nottingham, concerns over students using this technology as a tool for cheating, passing off its work as their own was uppermost and resulted in a strong response (Akintande 2024). The university quality manual was updated to read 'False Authorship is a form of plagiarism but is distinguished by the fact that the student has deliberately engaged with a third party and/or software tool to complete an assessment, either in part or whole'. (University of Nottingham Quality Manual 2024). This has since been moderated to include the notion that the rubrics might include the requirement to use AI.

From my observations at staff meetings and in student liaisons, there was a constant impression that the academics were constantly playing catch up in an area where progress is rapid and unconstrained. There was a reluctance to admit to the use of these new technologies. When I questioned students (and colleagues) about their use of LLM AI the answers were often shrouded in untruthfulness until I started the conversation by revealing my own use of AI. Once this common ground had been established, I found that nearly all students that I spoke to were using it citing, mainly, that they would be at a considerable disadvantage with regards to their colleagues if they did not (indicating near

universal uptake). They did, however, voice their fears about how reliable the AI was and what would happen if their use of it was revealed. This is symptomatic of the broader questions about the relationships between students and teachers (Guilherme 2019).

Taking note of this, I decided to work on an assessment that strategized the use of AI as a measure of its reliability and also introduce the students to the issues that their work would face during the marking and feedback process.

The pilot study: An exercise in using AI within an existing module.

Initially, I worked with a group of students on a section of a module for which I had sole responsibility. The master's programme in Biological Photography and Imaging contains many key sections to enhance employability among its graduates. The section that I was going to introduce AI to was the Identification Project. The original impetus for developing this as a key skill for the students was from discussion with a number of wildlife trusts and environmental organisations. They commented on the lack of field experience and identification capacity found in graduates from many biology and zoology courses from universities all over the UK. The teaching team on the MSc responded by incorporating a number of local field trips led by staff and external experts in natural history along with giving them experience of using keys and guides. The result was that students would submit coursework that incorporated the identification (with positive reasons) of four organisms: a vertebrate, an invertebrate, a plant and a fungus.

The next question was 'how can this be integrated into the master's and undergraduate teaching?' One obvious component for the use of AI was one of the traditional cores of the module teaching field craft and the use of dichotomous keys to identify wildlife that had been photographed. I rewrote the brief to include three aspects of AI assistance.

1: Choose an area of the campus and sample the bird song using the Merlin app. Merlin is an audio app that listens to ambient noise and picks out birdsong and identifies the bird from a list of similar noises recorded and identified by experts.

2: Photograph a number of the birds and identify them using Google lens. Google lens recognises objects and text and draws the viewer to look at similar objects found on various websites. It can also translate text from other languages.

3: Use ChatGPT or another LLM AI to describe the area and the birds. They were asked to include references. The students were then required to:

1. **Mark** the AI's text. I was unprepared for how little experience our masters students had in writing essays and even less in marking criteria so considerable guidance was given to them so that they understood how marking schemes work and what issues warrant the detraction of marks.
2. **Write** a 500-word **personal reflection** about what it was like using these programmes and whether they will be a help or hindrance to people developing skills in Natural History and identification. This should be written as a description of their personal experience, thoughts and understanding of the encounter and/or partnership with artificial intelligence.

I later considered that this would also be useful as an exercise for the undergraduates so rewrote the brief for my tutorial group (zoology and biology) so that their first essay (a formative exercise) would involve conducting the same task. They would choose the topic and we would discuss it in one of our tutorial sessions. This would, subsequently, be a way of introducing critical thinking, the assessment process, how marking criteria work and the importance of feedback.

Looking at the results of this exercise I applied, retrospectively, for ethical approval to use the information that had been collected to

Results and discussion.

AI for identification.

For the MSc students using Merlin and Google lens their initial reactions were of awe and amazement. These were soon seasoned with concerns that there was no way of corroborating the results without needing to develop expertise in the area. Both programmes were adept at producing results, but the data has to be taken on trust. Their conclusions were that parallel competencies had to be in place to validate the AI decision. This actually stimulated active learning as they used field guides and discussed their work with local experts.

The benefits and disadvantages of using AI for producing text.

After overcoming the initial trepidation and requiring more guidance and reassurance about what was expected of them, the students submitted both their marks and feedback on the essay that the AI had written and their reflective essay on the process of using AI as a tool. Especially for the 1st year tutees, essay writing was not expected in their 'A' levels. The topic of essay marking and feedback needed to be carefully introduced, and the students needed support and encouragement in order for them to work out what was required and how to evaluate what they were reading.

When discussing the use of AI, the initial reaction was one of fascination. There were a lot of positives. Their comments addressed how helpful it was in producing initial drafts. Furthermore, a particularly useful facet was its ability to make links that were not always central to the prompts that it had been given. One example was the fact that it noted that the local areas were managed to promote wildlife. The students were also able to follow the logic of its layout and gain experience of how to structure essays and write with an increased appreciation of flow and grammar. They felt that it was a good way to gain confidence and that it would act as a template and guide for them to use when they, crucially, wrote their own essays.

On the negative side, however, they noted that there were many features that might be detrimental. The hope in the use of AI was that it would save them time and effort by planning and, to some extent, executing an essay. What they found, however, was that, when reporting facts (let alone opinion) the AI was not trustworthy and the students were constantly fact-checking and, because they were marking the material, it was obvious that the AI was padding out some sections of the essay and there was considerable repetition. The arguments sometimes lacked in substance. The other main issue was the lack of attribution. Many references, particularly for geographically centred discussions contained false references (hallucinations) and many of the real references were quite out of date. The students were made aware that they did not know where the AI was finding its information and several noted that if attribution was unclear then the material that had been submitted could neither be fully trusted nor could it be excluded that it was plagiarising. The notion of expertise was then brought to the forefront and what sort of material could someone trust to be reliable and truthful?

What of the future?

Humans are easily fooled, and the advent of AI and its incredible capacities are stretching our abilities to distinguish what material is derived from a human and what from an AI. At this point in time, the attitudes of the students who have been using AI have changed from it being a panacea to it being helpful but flawed. The issue of hallucinating some information is critical, but this is entwined with the issue of attribution, plagiarism and there not being any form of transparency on where the information is coming from, whether key scientific journals are involved or whether it is obtaining information that has been created by other LLM AIis. This means that any text generated by AI needs to be checked and corrected. The development of skills in how prompts are written is crucial (we used Birtles 2023). One of the main points that the students returned to is what the technology will look like in 5 years' time? How will an ethical framework develop around this technology and what will the partnership between AI and humanity look like?

Concluding remarks.

The use of this method for promoting critical thinking, active learning and self-reflection should be used sparingly. The MSc students, used to writing essays according to marking rubric and feedback found the exercise interesting and engaging. They learned that the text generated by AI gives a probable answer and not a knowledgeable one and that it needs to be carefully monitored for errors and 'hallucinations'. They are now more nuanced and wiser about the application of this technology to their

learning journeys. The first-year undergraduates, working through the transition from school to university found it more challenging, but they, too recognised swiftly that an LLM generates substantial amounts of plausible text very quickly, but which may be full of errors owing to the fact that AI does not understand its own outputs.

Although this is a preliminary study with low data (n=10) the universal themes that were expressed were that the AI generated text reads authentically and is well expressed. It was only when the text was probed more deeply that the flawed arguments, fictitious referencing, unlikely observations and vague descriptions become noticeable. It does score well in the breadth of scope, and this was well received by this group of students. Being asked to critique an AI derived essay had a considerable effect on their perception on the authority of generative AI text, its research parameters and how to phrase their prompts.

Despite all the misgivings and in the face of the large environmental impact of these AI, it is hard to come to any other conclusion than that it is here to stay, and AI literacy is crucial (Walter 2024). Dealing with the omnipresence of AI in teaching means that we will need to adapt to it and, not only develop our teaching methods to incorporate it, but also work to deal with its strengths and weaknesses. Students with special educational needs (SEN) as well as those for whom English is an additional language may benefit from the grammar and style enhancements that it can suggest, and many people can profit from its ability to summarise complex papers, check through code for errors and highlight areas of interest that may have been overlooked. The future has arrived.

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From Lecture planning to therapy: The utilisation of Artificial Intelligence amongst staff and students in Strathmore University Nairobi-Kenya

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Abstract

Artificial Intelligence (AI) is rapidly transforming the landscape of higher education, reshaping both the delivery and uptake of academic content globally. In Kenya, Higher Education faculty members face the persistent challenge of balancing multiple responsibilities, including teaching, research, assessment, and administrative duties. The pressure to meet research publication expectations while managing extensive teaching workloads has often resulted in an imbalance, with either pedagogy or research receiving less attention. Additionally, concerns surrounding faculty and student mental and physical well-being continue to emerge amidst these growing demands. This paper examines the role of AI in mitigating these challenges within Strathmore University- Kenya, focusing on its application in enhancing teaching efficiency, research productivity, and student engagement. Findings indicate that AI is not only a valuable cognitive tool for brainstorming and academic inquiry but also serves as an unconventional support system—assisting faculty in workload management and even acting as a form of therapeutic intervention for students navigating academic pressures. The study employs a case study design and underscores AI's dual function as both enabler and disruptor of academic practice.

Key words: Artificial intelligence; higher education; wellbeing; Chatbots

Introduction

Since the 1955 seminal Dartmouth Summer Research Project on Artificial Intelligence (AI), AI has emerged as a transformative field in society and has gained massive popularity around the world. It has proffered solutions to real societal problems through insights and automation. John McCarthy, who coined the term Artificial intelligence, defined it simply as, "the science and engineering of making intelligent machines". UNESCO (2019) defines Artificial Intelligence as the capability of a device to perform functions normally associated with human intelligence. Put differently, it refers to the ability to perform human cognition and to think (Brigadier General Y.S 2021). Artificial Intelligence has revolutionized multiple fields, including medicine, finance, transportation, and education, by enhancing

efficiency, personalization, and innovation. Recognizing its potential, the African Union (AU) adopted the Continental Artificial Intelligence Strategy in 2024, emphasizing AI's role in advancing Agenda 2063 and the Sustainable Development Goals (SDGs) (AU, 2024). In education, the strategy highlights AI's capacity to promote higher-order thinking and improve formative assessment when integrated with effective instructional design.

60% of Africa's population is under 25 and holds immense potential for socio-economic growth. However, its higher education sector faces significant challenges, including low enrolment rates (9% in sub-Saharan Africa compared to 42% globally), high student-to-lecturer ratios, and limited resources, all of which strain education quality (UNESCO, 2024). AI presents an opportunity to bridge these gaps by enhancing accessibility, improving learning experiences, and reducing faculty workload.

This paper uses Strathmore University in Nairobi, Kenya as a case study to explore how AI is being utilized to address challenges in African higher education. The central research question guiding this study is: How is the utilization of Artificial Intelligence in Education addressing or exacerbating challenges in university education in Kenya?

Literature review

Artificial Intelligence (AI) is a game changer in various fields and education is no exception. Its integration in African higher education institutions is helping to address key challenges. AI enhances student engagement, improves curriculum planning, increases accessibility, and supports mental health, but it also presents ethical concerns and risks related to over-reliance, bias, and data privacy.

Enhancing student engagement and learning

AI has been instrumental in fostering student engagement by making learning interactive and responsive. Studies show that students respond positively to AI-driven exercises, which spark curiosity and encourage deeper exploration of topics (Jackson, 2024). Learning platforms such as Menti and Kahoot allow students to participate anonymously, making classroom discussions more inclusive while fostering cognitive development through active dialogue (Mayhew et al., 2020; Alexander, 2017). Instructors also benefit from AI-driven curriculum planning. AI helps educators stay updated with current discussions, enabling them to curate course content that aligns with real-world applications (Takyar, 2024). This ensures that students develop relevant skills for both academia and the job market. Additionally, AI provides students with problem-solving experiences that mirror real-world AI applications, better preparing them for careers in technology-driven industries.

AI as a solution to faculty and administrative challenges

One of the most pressing issues in African higher education is the student-to-instructor ratio, which often compromises learning quality. AI has been found to bridge this gap through educational chatbots, which use Natural Language Processing (NLP) to provide instant and personalized responses to student queries, mimicking instructor feedback (Essel et al., 2019). These tools not only reduce instructor workload but also address students' hesitation in seeking clarification due to fear of negative feedback (Oktaria & Soemantri, 2021).

Beyond classroom instruction, AI assists faculty in administrative and research tasks. It helps draft course outlines, create teaching materials, and automate assessment processes. Additionally, AI supports academic research by summarizing large volumes of literature, identifying relevant articles, and analyzing data using statistical models (Heller et al., 2005). By streamlining these processes, AI allows faculty to focus more on research and student engagement rather than time-consuming administrative duties.

Mental health and AI-enabled support systems

Both students and faculty experience high levels of stress, which AI has increasingly helped to mitigate. The limited availability of psychotherapists in Africa has made AI-based mental health support a valuable alternative. AI-powered chatbots and therapy apps offer personalized emotional support, reduce stress, and enhance motivation (Kamita et al., 2019).

For students, AI can function as an accessible and cost-effective mental health tool, providing coping strategies and personal coaching (Dekker et al., 2020). Teachers, on the other hand, can use AI to research strategies for supporting struggling students while maintaining privacy and anonymity.

Ethical and practical challenges in AI adoption

Despite its benefits, AI raises ethical concerns, particularly on academic integrity and data privacy. AI enables cheating by offering ready-made answers and reducing student engagement in critical thinking and independent research (Goteka, 2024). Overuse of AI can also lead to dehumanized learning, where essential skills such as writing, critical thinking, and problem-solving are lost (Ju, 2023; Vernersson, 2025). Bias and accuracy issues hinder AI's formal adoption in education, as models trained on existing data may reinforce biases and produce misleading responses. Regular updates are needed for fairness and accuracy, but most educational users lack control over these processes, raising concerns about AI reliability (Jackson, 2024).

In addition, AI exacerbates inequalities between students with and without internet access. Those with access to AI tools benefit from improved learning experiences, while others without reliable internet or technological resources are left at a disadvantage, impacting their academic and career preparedness (Trucano, 2023).

Theoretical Framework

Constructivism Learning Theory.

Constructivism posits that learning best happens through experiences. Developed in the early 20th century by John Dewey (1923) and his successors, it is a learning approach that focuses on the 'cognitive' abilities of the student through 'mental construction' (Bada, 2015), where students internalize concepts through building on what they already know. Thus, the aspect of 'experience' becomes key. Experience helps students have a personal interest and interpretation of content in class, and consequently, ideas tend to stick more. AI in Education has aided this process by enabling faculty to curate class activities that are engaging and experiential, therefore creating a personal way for the students to identify with the content. This is exemplified in the gamification of lessons which has been proven to have a positive impact on student engagement through immediate feedback, motivation and encouraged competition (Nacional, 2024).

Methodology

We chose a case study research design focusing on Strathmore University as the single case (Elman et al., 2016) to enable an in-depth "how" (Yin, 2018) exploration of the utilisation of artificial intelligence, among students and staff in the university. A case study approach was chosen for its ability to explore a phenomenon within its environmental context (Ridder, 2017). A nonprobability sampling technique was employed, leading to the purposive selection of two distinct focus group discussions: one comprising staff members (10 participants) and another consisting of students (8 participants), both drawn from various faculties, including Humanities, Mathematical Sciences, and Business. Additionally, an in-depth interview was conducted with a Director of Academics from one of the schools to gain further insights.

Background to Strathmore University

Strathmore University (SU, 2025) began as Strathmore College and was established in 1961. It was the first multi-racial, multi-religious, and socially inclusive college in pre-independence Kenya. Over the decades, Strathmore expanded its academic offerings and infrastructure, growing into a fully-fledged university. Strathmore is a private institution renowned for its academic excellence, innovation, and commitment to ethical leadership. It is this focus that has enabled a robust application of Artificial intelligence in enhancing higher education practice for both students and faculty.

Key Findings

Faculty Perspectives on AI Applications

Focus group discussions revealed that AI has been widely adopted for teaching, learning, assessment, research, and administrative tasks. However, concerns around ethical use, student over-reliance, and the need for AI literacy emerged as critical themes.

Faculty participants unanimously reported using AI in their work, for instance to create localized case studies to help students grasp difficult theories and concepts. Additionally, tools like Perplexity.ai and Semantic Scholar were employed to identify recent and emerging issues in academic fields. One lecturer remarked, *"I cannot imagine teaching without AI anymore. It helps me structure my lessons, find relevant resources, and even generate examples that students can relate to."* AI tools such as ChatGPT, Gemini, and Notebook LLM were frequently mentioned as essential for organizing lecture materials, summarizing concepts, and generating talking points for class discussions. Some faculty members also reported using AI to create innovative teaching aids. As one noted, *"I once needed to give a talk on integrity to first-year students, and AI helped me draft a sample curriculum, which I then refined to suit my needs*."

Beyond teaching, faculty use AI for assessment and evaluation. One faculty member described how AI has streamlined exam preparation: *"I use AI to generate multiple-choice questions (MCQs) for my classes, but I always have to go through them carefully because sometimes the answers it provides are not accurate*." Others used AI to design rubrics and structure assignments, create podcasts, and ensure that grading criteria is clear and objective.

Faculty also leveraged AI for research and administrative tasks. Tools like Grammarly and Quillbot assisted in improving language clarity and accuracy. One participant shared, "*I use AI to summarize large documents and extract key points, especially when I need to present findings quickly*." Others described using AI for data analysis, including regression modeling and identifying gaps in student performance. A statistics lecturer explained, "*If I input my data into ChatGPT, it not only helps me run regressions, but also recommends models and explains why they might be wrong. It's like having a research assistant at my fingertips*."

One of the most challenging expectations for faculty is to set several unique exam papers on time and AI has come to the rescue, "*I no longer submit exams and marking schemes late and I can only credit AI to helping me manage those deadlines*," admitted a lecturer.

Despite these benefits, faculty expressed concerns about students' over-reliance on AI. "*There's a complete disconnect between some students' AI-generated assignments and their actual understanding of the subject. I once had a group that presented an impressive PowerPoint, but when they spoke, it was clear they didn't grasp the material*." To address this, some faculty have begun embedding hidden prompts within assignments to detect students who copy AI-generated responses without critical engagement. However, ethical concerns remain regarding how best to integrate AI in a way that fosters genuine learning.

Interestingly, some faculty have used AI for mental wellbeing using sheng, a colloquial language widely spoken in Kenya. "*I prompt AI using sheng and it feels good when we can have a conversation in sheng. It helps me unwind*." Another remarked, "*A class could stress me and I will look for solutions with AI*." Yet another, "*I tell AI how I am feeling and it suggests things I could do to feel better. I also asked AI what I need to do to secure a promotion by the end of the year and it gave me great steps to follow*."

Student Perspectives on AI Applications

Students confirmed that AI is an integral part of their academic experience. One student stated emphatically, "*Everyone I know uses AI. It's just part of studying now*." The cited most cited tools included ChatGPT, Gemini, and Turbolearn, which were used for breaking down complex topics, summarizing lecture notes and papers, and generating potential exam questions.

For some students, AI provided support in areas beyond traditional academics. One participant shared, "*I use Biblechat.ai for my Bible study. It helps me understand difficult verses and even explains Christian perspectives on controversial topics like abortion."* Others found AI particularly useful in technical subjects, with one explaining, "*Sizzle Ai is a lifesaver for Math. It not only gives me step-by-step solutions but also suggests related courses I could take to understand the topic better*."

Students also discussed AI's role in freelancing and practical applications. One remarked, "*Landsite.ai helps me build websites. Some of us are already doing freelance work, and AI has made that possible*." Another noted, "*I use InVideo to create videos for my class presentations—it makes my work look professional without spending too much time*."

However, not all experiences with AI were positive. Some students found AI responses to be inaccurate or overly generic. One student expressed frustration: "*Sometimes ChatGPT just gives vague answers. I've learned that if you don't prompt it the right way, you won't get useful information*." Others complained about AI's limitations in contextualizing knowledge: "*It struggles with Kenyan English and doesn't always understand how we phrase things*."

A significant concern was AI's impact on academic integrity. Some students admitted to procrastinating more due to AI's convenience, with one confessing, "*I know I can wait until the last minute because ChatGPT will help me rush through my assignments*." Others acknowledged that AI had made them less engaged in critical thinking: "*I realized I haven't mastered certain skills because I rely too much on AI. It's making me lazy*."

Despite these concerns, students recognized AI's potential when used responsibly. One suggested, "*AI should have a feature that only gives hints instead of spoon-feeding answers. That way, students will still have to think critically*." Others called for AI tools to be more culturally inclusive and accessible, with one student stating, "*It should be adapted to African contexts, be cheaper, and have features for visually and hearing-impaired students*."

A surprising theme that emerged in both faculty and student discussions was the use of AI as a tool for mental health and personal well-being. Faculty members described instances where AI helped them manage stress and writer's block. One lecturer shared, *"There was a day I was really struggling with my writing, and I just had a chat with AI. It gave me a structured way to think about my ideas, and suddenly, I could move forward."*

Similarly, students highlighted AI's role in providing emotional support. One student mentioned, *"Sometimes, I use ChatGPT like a therapist. I just type out my thoughts, and it gives me advice. It's not perfect, but it helps."* Others described how AI made it easier for socially anxious students to seek academic help without the fear of judgment. As one student put it, *"I don't always feel comfortable asking questions in class, so I use AI to explain things later in a way I can understand."*

While AI is not a substitute for human interaction, these findings suggest that it is increasingly being used as a coping mechanism for stress, academic anxiety, and even personal challenges. There is however a notable risk of excessive reliance on AI for emotional support that could reduce students' ability to engage in meaningful human interactions.

Summary of Findings

The discussions revealed that while AI is transforming university education at Strathmore University, its use must be guided by ethical considerations and institutional policies. Faculty see AI as a powerful tool for teaching, assessment, and research, but remain concerned about academic dishonesty and the erosion of critical thinking skills. Students, on the other hand, value AI for simplifying learning and enabling practical applications, yet acknowledge the risks of over-reliance and reduced engagement in traditional learning processes.

Additionally, AI's unexpected role in mental health and personal development suggests new opportunities and challenges. While it provides support for stress management and social anxiety, its implications for human interaction and emotional well-being require further exploration.

Both groups emphasized the need for AI literacy programs and policy guidelines to maximize AI's benefits while minimizing its drawbacks.

Discussion

The findings from faculty and student discussions align with existing literature on AI's benefits in education. AI enhances student engagement by making learning more interactive and personalized.

Participants reported using AI for brainstorming, summarizing content, and generating discussion points, supporting Jackson's (2024) findings that AI fosters curiosity and deeper exploration. Students also found AI helpful in simplifying complex concepts, promoting autonomous learning.

AI has also improved curriculum planning and class delivery, enabling faculty to stay updated, curate relevant materials, and design better teaching methods. This aligns with Takyar's (2024) assertion that AI supports dynamic course structuring for industry-relevant skills. However, faculty emphasized the need for refining AI-generated content to maintain academic rigor and contextual relevance.

Another key benefit is inclusivity. While Brahim-Said (2024) highlights AI's role in assisting neurodiverse learners with time management and personalized learning, Strathmore students noted its impact in bridging knowledge gaps, particularly for socially anxious learners. Faculty echoed this, using AI to create alternative learning materials like podcasts and voiceovers for diverse learning preferences.

Despite these advantages, AI raises ethical concerns. Faculty and students reported increased academic dishonesty, with students relying on AI-generated content without critical engagement, echoing Goteka's (2024) concerns about AI-facilitated cheating. Faculty noted that AI-generated assignments often lack a personal voice, making it harder to assess true understanding.

A recurring concern was AI's potential to dehumanize learning. While AI enhances efficiency, overreliance can erode critical skills like research, problem-solving, and independent thinking. Faculty observed cases where students produced high-quality AI-generated presentations but struggled to explain their content, reinforcing Goteka's (2024) argument that excessive AI use may lead to cognitive regression. This highlights the need for educators to balance AI integration while preserving essential academic competencies.

AI bias and accuracy remains problematic (Jackson, 2024). Students and faculty found AI-generated content generic or inaccurate, requiring verification. Despite AI updates, students often lack critical assessment skills. Faculty stressed the need for training in effective prompting, multi-source verification, and ethical AI integration, advocating for institutional guidelines and structured training, since they largely taught themselves AI use. Students emphasized the need to adapt AI to local contexts like Kenyan English and affordability. There is a need for universities to develop AI policies promoting responsible use, enhanced AI literacy, and balance automation and critical thinking to ensure AI's positive impact on higher education.

Conclusions

This study explored AI's impact on university education in Africa, focusing on Strathmore University. Findings show AI enhances teaching, learning, research, and administration by boosting student engagement, addressing faculty shortages, and supporting mental health. However, challenges such as academic dishonesty, over-reliance, cognitive skill erosion, and ethical concerns must be addressed. Universities should prioritize AI literacy, responsible use, and equitable access. Thoughtful integration can improve education quality and accessibility, but a balanced approach is essential to preserve critical thinking and human-led learning.

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A Content Analysis of the Discourse on AI in Education in the Kenyan Print Media

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Type of submission: scholarship-inspired working paper

Abstract

News media coverage plays a critical role in shaping public perceptions about new and emerging technologies such as Artificial Intelligence (AI). One of the main debates in technology enhancing education in recent times revolves around the concept and use of AI. While debates on policy in AI in education are ongoing in many countries, mass media shape public opinion by highlighting certain ideas while downplaying others, eventually impacting on the direction and content of policy. This paper examines how AI in education is currently construed through the lenses of print media in Kenya. To understand how the discourse on AI in education has been framed by the Kenyan media, a content analysis of articles on the print media on this subject was conducted. The framing theory informed the study. The results reveal mixed reactions towards AI in education. There is a dominant supportive environment from the sentiment raised. Nevertheless, there is a need to address some identified grey areas that have been expressed in the findings. Policy makers will find the nuances expressed through the reviewed discourse useful as they develop policy and a guiding framework for AI in education in the country.

Key words: AI in Education, Media representation, Framing

Introduction

Recent years have seen a rapid increase in Artificial Intelligence (AI) platforms, ranging from Large Language Models such as ChatGPT and Gemini to the open-source models such as DeepSeek. Observed to be the Fourth Industrial Revolution, AI has attracted interest from policymakers and practitioners in almost every sphere of human existence. This in turn means that every industry must devise ways of deriving maximum benefit and minimal harm from AI. Current debates on technology are focused on AI tools such as large language models, generative AI and its applications in different fields (Krause, 2024). In education circles, while AI is expected to boost productivity and innovation, it has been received with both caution and excitement. Many countries are yet to develop a policy to

guide the use of policy in this sector. A lack of policy on AI in education keeps educational institutions and teachers in a dilemma on whether AI can be integrated into education (Bohara & Rana, 2024).

AI has been a subject of debate in the mass media in recent years. Through this media coverage, existing literature has demonstrated how news media sentiments have shaped public perceptions of AI (Ittefaq, Zain, Arif, Ala-Uddin, Ahmad & Iqbal, 2025; Owsley & Greenwood, 2024). The mass media plays a crucial role in setting the agenda for public discourse and shaping debates that inform policy formulation. Media narratives influence perceptions of the public towards issues and this perception has an influence on public discourse and policy developments (Rosa, 2024). This means that the media plays a big role in the way masses and leaders conceive 'reality' on different issues. Extant studies have demonstrated that the media plays a critical role in shaping public perceptions about AI (Ittefaq et al 2025; Choi, 2024). Recent decades have witnessed a surge of interest by scholars in studying how news media frame new and emerging technologies across different contexts (Ittefaq et al, 2025).

In Africa, AI readiness and policy development efforts are at a nascent stage (Diallo et al 2024). Kenya has been at the forefront in developing a national framework for AI. To realise the goal of developing and implementing a sound AI policy and strategy, understanding the nuances of the public on this matter is critical. The mass media is at the centre of setting an agenda for public discourse on any issue. As the country continues developing guiding frameworks for AI in education, it is critical to identify the current public perceptions that have been set by the media. This working paper aims to establish how selected articles from three mainstream Kenyan newspapers namely *Daily Nation, The Standard* and *The Star* have represented the issue of AI in education with a view to determining the frames that the masses and policy makers are consuming as they prepare an AI policy for the country. This working paper delves into the representation of AI in education in the Kenyan print media with a view to consolidating a picture of the foregoing discourse that are likely to shape the policy environment for AI in education in the country. This study aimed at finding out the current mindsets of Kenyans regarding AI in education through the ongoing discourse in the media which will play a crucial role in shaping public perceptions of AI in education in the Kenyan context. The study was guided by this research question: how do articles in the main newspapers in Kenya frame the concept of AI in education?

Literature Review

In the global context, scores of studies have been conducted on AI in education. Among other issues, contemporary debates in scholarly circles have generally centred on whether AI is likely to replace teachers, (Selwyn, 2019; Chan &Tsi, 2024; Karakose, 2024), the role of AI in education (Harry, 2023; Warsi, 2025; Nguyen, 2023) and challenges of AI in education (Kayyali, 2024; Jie & Kamrozzaman, 2024). This literature has reflected a general trend towards complex and mixed perceptions of AI in education. On one hand, there is unequivocal support for the use of AI in education while on the other hand, there are concerns about the possibility of AI doing more harm than good in education. The latter studies underscore the need for thoughtful implementation and ethical considerations (Jie & Kamrozzaman, 2024).

Other scholars have focused on sentiments expressed through coverage of AI in general in the mass media (Ittefaq et al, 2025; Owsley & Greenwood, 2024). The literature in the area of media representation of AI has primarily focused on AI in general and just a handful of studies have focused on media representation of AI in education. Studies on this subject are rare, especially in the global south. Ittefaq et al (2025) posit that research to date has yet to examine AI news coverage comparatively between the Global North and the South. The dearth of research in this area, especially in the education sector necessitated this study.

Previous studies on analysis of media representation have used and recommended the use of framing theory in similar investigations (Jones, Crawford & Jancey, 2024; Chuan, Tsai & Cho 2019). Entman's framing theory provided a framework for content analysis done in this study. Entman (1993) defines framing as making some aspects of reality more salient in a text in order to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described. According to this theory, the manner in which an issue is framed and discussed through certain viewpoints in the media can influence how a society makes sense of that issue (Vicsek, 2011). Framing has wide implications beyond theoretical discourse since it has an impact on policy

direction. Framing requires a researcher to construct 'frames' based on the research question of a study. The frames are generated through the themes constructed from the data during analyses.

The frames that are given more attention through repetition in the analysed data make them appear more prominent and desirable.

Findings

Below is a table demonstrating part of the analysed content analysis data. The data is based on excerpts from newspaper articles on the topic of AI in education. The emerging themes have been categorised into several broad thematic areas.

Newspaper & date	**Title of article**	**Key quote (s)**	**Tone/sentiment** **(+ve, -ve, N, mixed)**	**Main themes(caution, fear, ethical concerns, supportive)**
April 2023 **(Daily Nation)**	**AI poised to upend education, edge out teachers**	- AI would revolutionize education in Kenya - AI could enhance personalized learning - Render Kenyan education system impotent AI may edge out teachers	Mixed with more positives highlighted on the benefits of AI, but concerned with capabilities i.e Infrastructure to accommodate and train on AI preparedness and loss of jobs especially to teachers	- Ethical concern i.e Biasness and Caution i.e No infrastructure and skills to accommodate the AI
June 2023 **(Daily Nation)**	**How to prepare students to utilise artificial intelligence**	- Students adopting AI in education - Integrate AI into the curriculum Equip for future jobs preparation	More positive sentiment. The tone is full of optimism	- More supportive of the AI adoption in education with a need for a proactive approach
September 2023 **(Daily Nation)**	**Why AI in education is inevitable, and what sector players must prepare for**	- Inevitability of AI adoption - Could Enhance inequality and digital poverty - Need for multisectoral collaboration in AI adoption as a proactive measure	Generally positive in approach with an encouragement for a collective approach	- Supportive of AI adoption with a need for expanded synergy across board
January 2024 **(The standard)**	**Artificial Intelligence to revolutionize education,**	- Adoption of technology and acceptance historically - Opportunities AI bring to education i.e improved	-Positive with associated benefits of AI	- Supportive of the AI revolution -Caution on unpreparedness i.e upskilling and regulation, similar to Cyber Security.

	experts say	learning and proficiency		
September 2024 **(The standard)**	**Tripartite approach needed to realise full benefits of AI in education**	-Technological revolution in Africa - AI as a catalyst for economy - Glaring skill gap in AI in Africa - Tripartite collaboration i.e industry, academia and government	- Neutral approach where the writer mentions the opportunities and dangers in equal measures. Calling all sectors to action	- Caution raised with missed opportunities if skill gaps are not addressed - Raises ethical concerns in the field of AI that need research to address them
January 2024 **(The standard)**	**ChatGPT and AI will have a lot of impact in the education sector**	- Global reaction to ChatGPT AI - Accuracy of ChatGPT AI - Supplement AI in Education	- Article is mixed where the negatives are strongly put, but drawing some value with the ability to enhance education	- Raises the ethical concerns in education but supportive because of the enhanced value to education
January 2025 **(The Star)**	**Embracing AI education is not a luxury but a necessity**	- AI adoption as a necessity - Fragmented integration of AI in education - Global Tech divide	- The article is coming out in a negative sense since a delay in adopting AI framework would be at our disadvantage - Unskilled personnel inAI	- There is fear expressed if a proper adoption of AI is not followed i.e miss out in the tech benefits
January 2025 **(The Star)**	**EXPLAINER: What to know about the International Education Day**	- AI and Education - Human agency in technological acceleration - AI regulation	- Holding a positive sentiment with the celebration of education by institutions and collaboration to enhance meaningful regulation	- Supportive of adopting and regulating the use of AI in education.

Method

A qualitative content analysis was employed in this study. Content analysis has been used in previous studies as the most appropriate method in analysing media representation of a certain topic or policy. Data were analysed thematically to identify the most prominent emerging arguments in the extracted newspaper excerpts. In comparison to television and radio, print media provides the most appropriate data for analysis in this study since the required articles are available on the news media archives. The study used a purposively selected sample of newspaper articles from the three major newspapers in Kenya. The three newspapers command the highest readership in the country (Media Council of Kenya, 2024). The inclusion criteria for the selected articles related to articles that were published in those

three newspapers that are publicly available; the articles must relate to the topic of AI and education in Kenya and should have been published within the last 5 years (2021 - 2025). Only publicly and freely available articles were analysed, hence there was no breach of ethical considerations.

The research procedure involved an online search conducted on the website of each of the three newspapers using the keywords 'AI' and 'Artificial Intelligence'. The papers identified were screened manually to check their relevance to the field of education. The ones that were not related to education were excluded from the study. The selected articles were chosen for content analysis. The total sample of articles identified was used for analysis. A total of 40 articles were selected for content analysis and subsequently coded manually for dominant positive or negative sentiments towards the use of AI in education, informed by the framing theory. Categories were created to categorize the frames of AI in education as either positive, negative or neutral. The specific words used in creating those frames were delineated. The categories were used to identify the patterns, trends and dominant themes based on their numerical strength. To enhance the reliability of the qualitative analysis two coders participated in the coding and agreed on the code whenever their individual interpretations differed. The findings were interpreted in light of the research question of the study and summarised to make conclusions.

Discussion of findings

The content analysis of 40 newspaper articles reveals critical insights into how the issue of AI in education is framed in Kenyan print media. The analysed data identifies 3 dominant themes that highlight the main perceptions on how AI in education is understood. The dominant themes are: support for AI in education, caution and feeling of unpreparedness; ethical concerns and fear of exclusion.

Support for AI in Education

With expressions such as AI providing personalised education and tutoring, AI complimenting teachers, providing critical thinking skills, AI revolutionising education in Kenya among others, the reviewed articles demonstrate a dominant desire to incorporate AI in the education system. The supportive voices highlight its potential to provide learning that is personalised and specific to individual needs. This will lead to a transformative education that will improve learning outcomes. The role of a teacher in the learning process will also be transformed since AI will take part of the tasks that have been traditionally executed in a classroom setting. Such a scenario is viewed as an avenue to expand learning beyond the classroom and an opportunity for learners to take charge of their own learning with the support of AI.

Expression of caution, unpreparedness and ethical concerns

Although the dominant frame in the analysis was characterised by the theme of support for AI, the other themes are related in the sense of providing caution on the use of AI in education. Viewed from this lens, the fear of AI and the need to address the various issues raised emerged as an overarching theme. The key expressions highlighted were: AI may edge out teachers, AI may render Kenyan educational system impotent, it can increase the access gap leading to more inequality in society, fears of job losses and ethical concerns among others. Ethical concerns have been raised by Shiohira & Holmes (2023) who exemplifies ethical issues in relation to whether the pedagogical approaches used by a majority of AI are sound, whether the AI applied is effective at improving learning outcomes and whether sufficient attention is paid to building infrastructure for its use.

The reviewed articles emphasize on the need to provide infrastructure and access to AI for all learners in order to create equal opportunities for all. Failure to do this in the country will widen the skill and knowledge gap among learners from different social-economic backgrounds.

Conclusion

This working paper has explored the framing of AI in education in Kenyan print media. The findings reveal a supportive environment that highlights the potential for the acceptance of use of AI to support teaching and learning. It is evident that among the authors of the articles reviewed, there is widespread support for the use of AI in education. Nevertheless, there is also a dominant perception of caution that casts a spotlight on the need for policy makers to address the issues of ethical use and bridging the digital divide that might exclude the marginalised from leaping the benefits of AI in education.

The mixed reaction emanating from the findings of this study points to the readiness of the Kenyan populace for AI in education but this needs to be executed with keen consideration of the grey areas that have been pointed out. This underscores the imperative for policy makers to address pertinent issues such as development of a framework that ensures that ethical concerns are addressed. Policy should also address the concerns of digital divide and inclusivity to provide a level playing ground for all learners regardless of their background. The current study relied on sentiments expressed from the print media in Kenya. Further studies need to explore this topic from other media platforms such as radio, television and social media in order to provide a complete picture of the discourse on AI in education in Kenya and beyond.

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Exploring the Integration of Generative AI in Further Education Teaching Practices

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Abstract

The study explores the use of artificial intelligence (AI) tools in Further Education (FE) teaching methodologies, focusing on adoption trends, pedagogical evolution, institutional influences, and implementation obstacles. The research uses qualitative data from interviews with five educators from various disciplines and institutional types. Key themes identified include diverse adoption rates, individualized learning opportunities, and institutional inequalities in AI implementation. Despite 80% of participants using AI for lesson planning, significant disparities were observed in institutional support, with 40% reporting robust assistance and 20% cited inadequate resources. Obstacles such as infrastructural constraints, limited access to professional development, and concerns about output reliability highlight the challenges in integrating AI. Disciplinary disparities highlight the need for customised applications and limited application of AI for administrative functions and student assistance. The study contributes to existing literature on AI in education by highlighting the complexity and contextual subtleties of AI implementation.

Key words: Generative AI, Further Education, pedagogical transformation, institutional support, professional development

Introduction

The rapid advancement and widespread adoption of artificial intelligence (AI) in education, particularly through generative AI models like Claude AI, Gemini, Copilot, and ChatGPT-4, is fundamentally reshaping various sectors, with education being a significant area of impact. Generative AI offers unprecedented opportunities to support educators in a range of tasks, such as lesson planning, feedback provision, grading, and streamlining administrative workloads. This study focuses on Further Education (FE) teachers and lecturers, a crucial yet often under-represented group within educational AI research.

The study investigates 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?

This research 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.

The study, divided into two phases, involved workshops on generative AI applications and practical application in classrooms. Participants learned about tool models like Claude AI, Gemini, Copilot, and ChatGPT-4. They also engaged in collaborative learning through discussion forums, allowing for shared insights and challenges.

The study found that vocational teachers integrate AI for lesson planning and assessment customisation, while sixth-form teachers use it for administrative tasks and for enhancing student engagement in large classes.

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, Liu (2023), 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 institutional ethics review board, 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 ChatGPT were utilised to create customised lesson plans and instantaneous quizzes, facilitating a more flexible instructional approach. This shift corroborates Johnson et al.'s (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).

Limitations of the study

The study on AI integration in Further Education (FE) teaching practices has several limitations, including a limited sample size, insufficient diversity of perspectives, a binary analysis of institutional variables, a concentrated focus on educational instruments, and a lack of longitudinal data. The limited sample size may lead to over-representation of specific perspectives and may not accurately represent the diversity of FE educators. The study also neglects administrative uses of AI, such as student analytics and resource management, which are crucial for thorough AI integration. The lack of longitudinal data limits the study's ability to detect patterns or changes over time, and the lack of a temporal dimension makes it difficult to determine whether the results indicate a fleeting phase in AI integration or more persistent trends. The study also fails to explore the underlying reasons or possible remedies for challenges, such as infrastructure restrictions and access equity. The complexity of AI integration is also challenging to encapsulate in a limited study, necessitating a comprehensive examination using mixed approaches and interdisciplinary frameworks.

Conclusion

The study explores the potential of generative AI tools in Further Education (FE) pedagogy, revealing their transformative potential in lesson preparation, feedback delivery, grading, and resource creation. However, the integration of these technologies presents challenges, as educators navigate a complex educational environment with varying resources, policies, and student requirements. The research identifies four themes: Technology Integration Patterns, Pedagogical Transformation, Institutional Factors, Implementation Challenges, Professional Development Requirements, and Impact Variations. The study also highlights the need for institutional factors such as resource disparities, policy discrepancies, and support levels to ensure a systematic approach to AI implementation. Despite these

challenges, the study emphasises the potential of AI to improve pedagogical methods, enhancing lesson preparation efficiency, facilitating new teaching methods, and promoting student involvement.

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The Imperative to Revolutionise Higher Education Assessment in the Age of Artificial intelligence (AI)

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Abstract

The rapid integration of artificial intelligence (AI) tools such as ChatGPT, Copilot, and other generative-AI (GenAI) platforms, is transforming the requirements of assessment methods within the higher education sector. While AI holds significant potential to contribute to the achievement of the United Nations' Sustainable Development Goals four, eight, nine and ten, the rapid pace of technological advancements has introduced numerous risks and challenges associated with assessment in higher education that have outstripped current policy discussions and regulatory frameworks within the sector. This paper examines emerging literature to investigate how these technologies challenge conventional approaches to evaluating students' level of understanding, as GenAI allows for the creation of essays, reports, and other outputs that closely resemble human-authored content. The review highlights the urgent need to re-design assessment practices to uphold academic integrity, promote critical thinking, and adopt authentic methods of evaluating students' understanding that GenAI cannot easily replicate, but instead, encourages the use of GenAI to complement the learning experience. Additionally, this paper explores ethical considerations, pedagogical shifts, and practical strategies for educators and institutions to effectively navigate the evolving educational reality shaped by GenAi.

Key words: Generative-AI in Higher Education, Authentic Assessment Models, Academic Integrity Challenges, AI-Literacy and Pedagogy, Sustainable Development Goals (SDGs)

Introduction

The rapid advancement of artificial intelligence (AI), particularly generative-AI (GenAI) tools such as ChatGPT and Copilot, is profoundly transforming various facets of global society including the education sector (Bessette, 2023). This is because this technology has the capability to produce written outputs that closely mimic traditional human-authored assessments such as essays and reports (Porter and Machery, 2024). While promising in its capacity to produce these outputs, GenAI also introduces challenges such as an increased risk of academic dishonesty and an overreliance on GenAI by students in higher education in the context of traditional methods of assessment (Dawson et al., 2024).

GenAI's capacity to produce human-like content presents a dilemma: educators face an increasing difficulty in determining whether an assessment submission accurately reflects the student's level of understanding. This is because Waltzer, Pilegard and Keyman (2024) highlight that in their study, tutors were unable to identify 30% of GenAI generated assessment content. This threatens the validity of the

traditional assessment methods such as essays and reports which have long dominated the higher education sector (Wiredu, Abuba and Zakaria, 2024).

With this in mind, the rise of GenAI challenges the effectiveness of strict-liability models for managing academic integrity due to the poor-reliability of existing plagiarism detection tools because, in general, they fail to accurately distinguish between human and GenAI-generated work (Weber-Wulff et al., 2023). This highlights the urgent need to revolutionise the current assessment methods to prioritise real-world applications and assessment models in higher education, to effectively address these emerging complexities.

Opportunities and Challenges Posed by GenAI

Emerging research shows GenAI tools have transformative potential in education, enhancing writing, and providing personalised, interactive learning experiences. Malik (2023) surveyed 245 undergraduates from 25 Indonesian institutions, finding that students valued GenAI for grammar checks, plagiarism detection, translation, and essay planning, while also improving their writing skills, confidence, and academic integrity. Chan and Hu (2023) surveyed 399 Hong Kong undergraduates and postgraduates across disciplines, finding a generally positive attitude toward GenAI. Students valued its support for personalised learning, writing, brainstorming, and research. Similarly, Rojas (2024) found that GenAI enhanced students' scientific writing skills, improving both their writing process and outcomes. Moreover, Nguyen et al. (2024) examined how doctoral students interact with GenAI during the academic writing process, finding that students utilised it in various collaboration patterns, including using GenAI for idea generation, drafting, and editing. This therefore highlights the transformative potential of GenAI in education, showcasing its role in enhancing writing skills, providing personalised learning support, and promoting positive student experiences across diverse academic contexts. This encourages greater student engagement.

While emerging research highlights the benefits of GenAI, it however also underlines key challenges that educators must address. There are ongoing concerns about GenAI's potential impact on creativity, critical thinking, and ethical writing practices because overreliance on these tools may hold back independent thought and originality (Malik, 2024). Additionally, there is a risk of students misusing GenAI, such as allowing it to overshadow their academic identity in their work. Therefore, it is essential to provide clear guidance to ensure that students use GenAI effectively, responsibly, and ethically (Rojas, 2024; Nguyen et al., 2024). There are also concerns regarding the accuracy of GenAI-generated content, privacy issues, and potential impacts on personal development, career prospects, and societal values (Chan and Hu, 2023) as well as the potential of student's over-reliance on GenAI (Nguyen et al., 2024). With this in mind, it is evident that there is a need for further investigation into human-AI collaboration in education, with the commonality between most of the research on AI in education around the importance of understanding student perceptions and uses. This can then be used to inform educators and policymakers in effectively integrating GenAI technologies, ensuring that student needs and concerns are addressed, while promoting tailored educational strategies to enhance the effectiveness of AI-assisted academic writing and overall effective learning outcomes.

Shortcomings of Traditional Assessment Models and Solutions

The rapid advancement of GenAI technologies has prompted growing concerns over the effectiveness and fairness of traditional assessment methods in higher education. Pearce and Chiavaroli (2023) emphasise the need for institutions to rethink assessment strategies and support academic staff in evaluating both the purpose of assessments and the risks of GenAI misuse by students. This is because current summative assessment methods such as essays, article compositions, journal and book reviews, and lab reports, are increasingly susceptible to the use of advanced AI technologies capable of generating human-like text, which due to socio-economic disparities can create inequities in the assessment process (Xia et al., 2024). Furthermore, the misuse of these tools by students can lead to academic dishonesty such as plagiarism and unauthorised assistance in assignments (Cotton, Cotton and Shipway, 2023) and raising new challenges for academic integrity (Eaton, 2023). Concerns about students using GenAI to produce high-quality, potentially undetectable work compared to their peers who do not use it present a significant challenge that cannot be overlooked, therefore this suggests that

educators can no longer rely on non-invigilated assessments and 'artefacts' as accurate representations of student learning (Pearce and Chiavaroli, 2023).

Educators are increasingly revisiting the potential of oral assessment methods, such as assessed professional dialogues and viva-style assessments within the context of shortcomings of the current assessment methods. While past concerns have focused on issues such as perceived reliability, lack of standardisation, and the potential for assessor bias (Davis and Karunathilake, 2005), Pearce and Chiavaroli (2023) argue that oral assessments provide a valuable solution for evaluating higher-level cognition while reducing the temptation to misuse GenAI. On the other hand, Luo (2024) explored how GenAI is reshaping perceptions of originality in student assessments, highlighting that originality is often narrowly defined by concerns over plagiarism or academic misconduct. Luo (2024) highlights that this limited view may restrain the development of innovative assessment methods that harness the potential of GenAI. The author advocates for a more expansive understanding of originality, through urging educators to thoughtfully incorporate GenAI into assessments to enhance learning outcomes while upholding academic integrity. This highlights some of the debates surrounding the shortcomings of current assessment methods.

As traditional plagiarism detection methods struggle to identify AI-generated content, it has become increasingly evident that institutions need to adopt a more nuanced approach to GenAI in education. While emerging literature highlights the confusion and division among students and educators regarding the responsible, ethical use of GenAI in education without compromising academic integrity (Xia et al., 2024), it is crucial for institutions to adopt a balanced approach towards students' using GenAI in assessment. This approach should acknowledge the educational benefits of GenAI tools while maintaining rigorous standards of critical thinking and creativity. One way that this can be done is through an introduction of AI-assessment scale such as Perkins et al (2024) 'Artificial Intelligence Assessment Scale' (AIAS), which encourages students to engage with GenAI within an appropriate scope through requiring students to declare the extent to which they used GenAI within an academic submission, post careful brief of the extent to which GenAI use is permitted. Authors believe that alongside these clear guidelines on the extent to which students can use GenAI (Cotton, Cotton and Shipway, 2023) and authentic curricula and assessment that has been designed with GenAI in mind (Bahroun et al, 2023), the AIAS responds to some of the concerns that educators have and that it can be adapted and amended by the higher education institutions to fit their individual context needs. This indicates a potential for higher education institutions to employ a practical technique that fits within the wider constraints of a broader higher education policy (Perkins et al, 2024).

Authentic Assessment: A Path Forward

Strategic integration of GenAI into assessment illuminates a path forward through authentic assessment models that not only accurately evaluate students' understanding, but also promote AI literacy. Authentic assessment in this context refers to both the evaluative use of AI-generated outputs and the refinement of prompts, ensuring students engage critically with the GenAI (Villarroel et al., 2018). Therefore the assessment focuses on the learning journey, rather than merely on the output. Authentic assessments encompass methods that allow educators to evaluate comprehension within real-life contexts, encouraging students to apply their knowledge and skills to develop creativity and problem-solving – skills that remain challenging for GenAI to replicate (Vlachopoulos and Makri, 2024).

Authentic assessments offer a powerful approach to promoting deeper learning and engagement, helping students develop essential skills for both academic success and real-world challenges. Authentic assessments, such as project-based work, collaborative problem-solving, and case studies, promote active learning and student engagement (Almulla, 2020). By embedding GenAI usage requirements and disclosures within the assessment criteria, educators can encourage transparency while addressing concerns over academic integrity. These methods facilitate opportunity for students to demonstrate their learning journey for which they may have used GenAI, aiding students in developing intended outputs (Miserandino, 2024). By emphasising real-world applications and cognitive skills, such assessments promote critical thinking, creativity, and the ability to synthesise (Vlachopoulos and Makri, 2024). Moreover, this approach contributes to upholding academic integrity by training students to understand the appropriate use of AI tools, rather than prohibiting their use entirely which is not sustainable (Ateeq et al., 2024). This approach therefore not only prepares students to meet the

demands of modern workplaces but also ensures they become AI-literate, capable contributors to an increasingly AI-integrated society (Bearman, Nieminen and Ajjawi, 2023).

While authentic methods of assessment promote AI-literacy through demanding GenAI's use, the integration of this technology presents challenges, particularly in relation to cultivating critical thinking skills. TV presenter Jess Fong (2023) likens GenAI in education to a Sat Nav when driving a car, arguing that over-reliance on such tools can deter from learning to navigate and memorise surroundings which parallels research by Dahmani and Bohbot (2020), highlighting the cognitive costs of relying on external aids. To mitigate these risks, it is essential that authentic assessments are designed thoughtfully, incorporating GenAI tools, however without encouraging dependence to prevent students relying on GenAI and therefore miss the opportunity to engage in learning about how to find solutions to problems and thinking critically (Fong, 2023).

Research indicates implications of the use of GenAI on students' critical thinking capabilities. Critical thinking, referred to by Ennis (1987) as the rational thought process which impacts the determining what to believe or how to act, holds an evaluative and decision-making nature position within the lives of people. In contrast, cognitive offloading, involves the externalisation of cognitive processes through tools or external agents—such as calculators, or digital technologies like GenAI - to alleviate cognitive load and support mental tasks. Gerlich (2025) emphasises that GenAI can serve as a valuable tool for promoting critical thinking by facilitating cognitive offloading. In addition, Mollick and Mollick (2023) emphasise that mastering GenAI involves developing key skills such as critical thinking, clear reasoning, effective problem-solving, strong communication, and the ability to give and receive constructive feedback, therefore complementing the integration of GenAI, while Gerlich (2025) highlight a finding of a significant negative correlation between frequent GenAI usage and critical thinking abilities. This relationship is mediated by the increased reliance on cognitive offloading, highlighting the potential cognitive costs associated with excessive dependence on GenAI. It is therefore important to ensure consideration of this threat in arguments for a sustainable path forward in authentic assessment, and careful design of assessment methods.

Pedagogical and Ethical Considerations

GenAI holds transformative potential in education, particularly in promoting higher-order cognitive skills. At its peak, Bloom's (1956) taxonomy emphasises creating - synthesising knowledge and generating new ideas. GenAI supports this by enabling knowledge construction through acting as a tool that focuses on the learning process rather than the final output as discussed in this paper. However, its integration requires educators to frame learning objectives that emphasise the process and ethical use, ensuring that GenAI serves as a scaffold for creativity rather than a substitute for it.

Ethical considerations are crucial, especially in ensuring equitable access to GenAI. Socio-economic disparities risk deepening inequalities, which undermines the SDGs' of equitable education through students not having access or knowing how to use GenAI effectively (Varsik and Vosberg, 2024). Institutions must therefore provide universal access, AI training, and clear usage policies (UNESCO, 2021). In addition, SDGs highlight the significance of quality education, which resonates with a more personalised approach to education - early research supports this, arguing for the value of personal tutoring over group-based teaching (Bloom, 1984; Salvin and Karweit, 1985). With this in mind, GenAI's ability to learning experiences offers opportunities to enrich students' educational journey, reinforcing the SDGs' commitment to equitable and effective learning outcomes which requires to be carried out using effective pedagogical approaches to teaching and learning (UNESCO, 2021).

Effective implementation of GenAI aligns with established pedagogies of learning. Piaget's theory of cognitive development (1973) emphasises active knowledge construction, a principle reflected in authentic assessments that immerse students in real-world tasks relevant to their future professional contexts. Moreover, Situated Learning Theory (Lave, 1988) highlights the effectiveness of learning within meaningful social and practical settings. GenAI therefore complements these approaches by enriching authentic tasks with personalised and contextually relevant learning environments. However, this challenges educators to discern genuine understanding from AI-generated outputs, and demands a revaluation of learning objectives to prioritise the learning process over merely the outputs. Educators require ongoing professional development to integrate GenAI ethically and effectively, ensuring they

support rather than undermine pedagogical goals, demonstrated by a reaction in some practices reverting back to traditional examinations (Miserandino (2024), as a means to uphold the integrity of traditional assessment methods. Furze (2023) critiques this, advocating for iterative projects, as part of which GenAI can be used by students, contributing to the focus of assessing the learning process over outputs. Embedding discussions about ethical GenAI use into curricula promotes accountability, preparing students to navigate an AI-driven world responsibly.

Conclusion and Recommendations

This paper explored the assessment related benefits and challenges associated with GenAI in higher education. As this technology continues to evolve, traditional assessment methods are increasingly vulnerable to manipulation and misuse, complicating educators' ability to assess students' level of understanding effectively. Despite the clear risks of academic dishonesty and overreliance on AI, GenAI also offers benefits such as enhancing writing quality, providing personalised learning support, and promoting critical thinking skills. However, the rapid integration of these technologies necessitates a shift towards innovative and authentic assessment models that more effectively reflect students' understanding and critical engagement with modules. To address these challenges, higher education educators must embrace assessment methods that prioritise real-world applications, collaborative problem-solving, and AI literacy. This approach will contribute to preserving academic integrity and will prepare students for the demands of an AI-integrated workforce.

With this in mind, this paper recommends revising assessment frameworks to incorporate authentic assessment practices, which emphasise the learning process rather than solely the final product. In addition, the assessments should encourage students to engage critically with GenAI, using them as scaffolds rather than substitutes for learning. Moreover, institutions should provide clear guidelines on ethical AI usage, ensuring that both students and educators are equipped with the necessary skills and knowledge to navigate the evolving educational landscape responsibly.

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Using AI to support personalised learning for autistic students

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Abstract

Generative Artificial intelligence (GenAI) has enormous potential to transform special education, in particular, the education of autistic students. There has been a rapid growth in the exploration of AI and its uses in supporting autistic students, but available literature highlights that this has been largely focused on the benefits of social learning, gamification of learning, assessment, and robotics. Less has been said about the use of AI to support teachers in personalising learning activities for autistic students, suggesting that there is a gap that warrants further exploration. We argue that the use of AI to personalise the learning experiences of autistic children is of vital importance since autism is such a wide and varied spectrum, with no two autistic children presenting with the same needs and abilities. In particular looking at the use of AI to personalise lessons to include the focused interests of students could be a valuable method of using the transformational power of AI to improve the learning experiences of autistic children.

Key words: Autism, Artificial Intelligence, Personalised Learning, Monotropism, Focused Interests. Learning Support

Please note that this paper uses 'identity first' language which is the preference of the autistic community. (Keates et al., 2024; Bottema Beutel et al., 2021)

Context

Generative Artificial Intelligence (GenAI) has caused widespread concern for educators (Salloum, 2024). Lively and often heated debate can be heard around its ethical and responsible use (Holmes et al., 2022). Kotsi et al., 2025) highlight that risks related to privacy, security, data and bias are major concerns for educational establishments and add that its expansion could lead to "an over-reliance on AI, and diminished student and teacher autonomy" (p.11). However, educators should also consider potential benefits, particularly in the context of personalising learning for autistic students. AI's power to transform special education, specifically for children with autism, should not be underestimated (Kotsi et al., 2025).

Autism and Education

In the United Kingdom (UK) autism is considered a disability in that it can have a sustained and substantial effect on everyday life. Autism is described by the National Autistic Society (nd) as "A lifelong developmental disability which affects how people communicate and interact with the world," and although autistic individuals see autism as central to their identity, and "value neutral," they feel that society confers a negative framing on autism (Botha et al., 2020).

Autism is commonly accepted as being hugely diverse and presenting differently in each and every individual (Qin et al., 2024). Habibi et al., (2025) evidence that assessing students with autism and personalising their learning effectively is a deeply complex challenge since the traditional methods that have been used are not able to assess and personalise to the extent that is required for students presenting with such a wide variation of abilities and needs. Consider for example how a mainstream teacher might do this for an autistic student who is non-verbal, and another autistic student who presents with savant syndrome; which according to Park (2023) is an exceptional ability or remarkable gift or rare talent.

Williams et al. (2019) provide evidence of difficulties associated with school life for those with autism. These can include sensory difficulties, acceptance, interpersonal relationships, and accessibility. Although these difficulties need to be addressed by schools, teachers in the UK face enormous workload and time pressures, and budget cuts (Wood, 2019; Brady & Wilson, 2022). All of which threaten to undermine the quality of teaching and support for students with special educational needs.

In the UK there has been a general drive towards including disabled children and those with special educational needs in mainstream schools, since the Warnock report of 1978. The number of special schools, and the children they serve, declined over two decades before increasing again after 2006 (House of Commons 2006; Black, 2019). Currently it is estimated that about 70% of autistic children are educated in mainstream settings, but genuine accessibility and the question of how to provide for the complex and varied needs of autistic children in the mainstream setting has long been problematised.

Dillon et al. (2014) evidence that autistic children in mainstream settings report no difference in school experiences to their typically developing peers, and suggest that social skills, relationships, functioning abilities and interpersonal strengths are on a par with mainstream pupils, providing there is good adaptive support form teachers. Many parents prefer to see autistic children in mainstream settings because of the potential for wider friendship groups and greater social interaction (Dillon and Underwood, 2012). The work of Hehir (2016) demonstrates the benefits that extend to students who do not have a special educational need as they gain opportunities to develop emotionally by having exposure to a truly inclusive environment. Whether children are in mainstream or special school settings, there is a statutory duty on schools to modify practices in order to meet their learning differences, and a moral imperative on teachers to adapt their teaching according to children's needs. Given the conflicting and competing demands on teachers, we propose that AI might offer personalised solutions that benefit both teachers and those they teach.

The Use of technology and AI in Special Education

The use of technology in special education is not a novel concept, and instances of its use extend over several decades. One example of this the use of Augmentative and Alternative Communication (AAC) for autistic students with communication difficulties, which began in the 1950s and has undergone many transformations and updates over the years. Iannone & Giansanti (2023) highlight the impact of AAC to support learning and help autistic students to develop language and express themselves effectively. Perhaps most importantly it is a tool to empower autistic students who experience difficulties in communicating and give them opportunities to voice their opinions and participate fully in the mainstream classroom. Looking to the future, Sennot et al. (2019) describe the almost magical potential and promise where AI and AAC intersect, arguing an ethical imperative to harness this power for children's benefits.

AI tools have also been used to monitor engagement (Kim et al., 2024) and have been used recently to assess autism (Biswas et al, 2021). Emojis have been proposed as a tool to help autistic children express their emotions to those around them (Wang et al., 2024). Kotsi et al.'s (2025) review of artificial intelligence interventions autistic children found that the available literature largely focused on the benefits of social learning, gamification of learning, and robotics, yet less has been said about the use

of AI to support teachers in personalising learning activities for autistic students, suggesting that there is a gap here that warrants further exploration. This, we argue, is of vital importance since autism is such a wide and varied spectrum.

Using AI to Personalise Learning for Autistic Students

Yang et al., (2024) tell us that AI can have a tremendous impact on adaptive teaching, including gamification of learning, immersive technologies to improve social skills for students with autism, and "tailored interactive learning environments." (p.25) This is an interesting concept and one that warrants further investigation. We suggest that one way of doing this could be utilising AI to create personalised lessons around the monotropic interests of autistic students.

Monotropic theory was first explored by the collective work of Murray, Lesser, & Lawson (2005). It is a form of hyper focus that is often synonymous with autism, and it is sometimes referred to as a 'special' or a 'focused' interest, or 'a passion'. It is said that these passionate and focused interests can lead to exceptional expertise and deep and profound knowledge in very specific areas. Monotropism is an ability to focus on a singular interest, often for lengthy periods of time, and in great detail and with sometimes unbreakable attention. This action can lead to a deep flow state of calm (Heasman et al. (2024). It is easy therefore to see its potential benefits to mental health and wellbeing (Wood, 2023) and also, its potential benefits to learning and the mastery of a topic.

An example of a monotropic interest might be a child that has a focused interest in dinosaurs. This is not just an ordinary interest but one that captures their imagination completely, and throughout each waking moment of the day. The child may be fascinated by dinosaurs to the extent that they spend inordinate amounts of time looking at, reading about, and thinking of them. AI has the potential to reimagine a comprehension exercise to include a dinosaur as a main character, to convert a lesson on DNA in science to reference these extinct creatures, or to create a geometric challenge in maths to measure the teeth of a dinosaur. This could transform the engagement of a child by valuing and including their interests.

Looking at AI through this lens, we can see the capability of AI to rewrite a lesson plan or learning resource quickly to include a child's monotropic interest while retaining integrity to the teacher's aims and learning outcomes. This would represent personalisation at a speed that a teacher would find impossible to uphold without the support of technology, holding enormous potential to revolutionise adaptive teaching and provide quick and effortless adaptations for the teacher. AI could also create personalised learning activities around monotropic interests that allow the child agency and autonomy to lead their own learning. This way of working could also encourage and enhance independent learning (Adako et al., 2024), though at this stage we envisage AI working alongside teachers, who provide the context and wraparound care that machine tutors cannot (see the UK government report Felix & Webb, 2024).

Alternatively, we might consider the intersection of AI with augmented or virtual reality, which might permit children to learn within a world that suits their preference and personality. Berenguer et al. (2020) is one of several systematic reviews that conclude that augmented reality technology helps to improve diverse cognitive and emotional processes and functional and motor skills, as well as social communication and facial emotion recognition. Though further research and development is undoubtedly needed, there appears to be evidence that gains realised by augment reality technology can be accelerated if personalised through the use of AI.

Challenges and Next Steps

One of the key challenges for developers of AI will be to work closely with educators and autistic people in order to create content that is inclusive, unbiased, respectful of diversity, and suitable for use in the classroom (Li et al., 2024). AI platforms that are specifically tailored to create personalised learning could be central to advancing teachers' abilities to teach adaptively and to work with the individual needs of the student, including their interests and tailoring materials for maximum engagement. This goes beyond existing Intelligent Tutoring Systems which "personalise" pathways to prescribed content, rather than tailoring interactive content to match a student's interests (UNESCO, 2021).

Despite a proliferation of papers discussing the ethical uses of AI in education, our understanding of ethics in schools is still described as 'fledgling' (Porayska-Pomsta et al., 2023, p.2). Concerns revolve around biases in both algorithms and source content: where users are perhaps more likely than most to accept AI output at face value and without critique, there are obvious dangers in exposing children

to content which might be misleading at best, and harmful at worst. Even those engaged in the newly emerging field of ethical educational uses of AI warn against complacency and blind spots when intents are genuinely benevolent (Holmes et al., 2022). Further ethical dilemmas might be presented by equity arguments, which are often underpinned by financial disparities, but none of these should be allowed to undermine potential progress in personalising children's support.

The opportunities AI affords necessarily bring additional challenges to education settings. As AI develops, there is a pressing need for teacher education and training so that they can become informed and adept users of new products. Research in the US and elsewhere demonstrates the need for skilled practitioners to be supported and surrounded by comprehensive policy frameworks to uphold integrity and inclusion, and minimise risk (Ghimire & Edwards, 2024; Salha et al., 2025), but Fullan et al. (2023) note the dearth of guidelines, policies and regulations relating to the ethics of AI in education—which leaves school leaders with the unenviable task of writing policy *ex nihilo*.

The place of robust research to support the development of policy and practice should not be underestimated, and the nature of the sudden and rapid developments in AI provide for a rich and unusual research field. Even as educators are trialling new approaches there are real opportunities for them to engage in the research itself, enabling them to become reflexive practitioners and insider researchers. Practitioner research examining AI as a potential tool to enhance the personalisation of teaching also opens up opportunities to really hear the voices of autistic learners: only they will be able to truly tell us if the ambitions of adaptive teaching have been achieved.

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