Research Article

Harnessing AI for content and strategies in instructional purposes: Limitations and red flags

Analiza B. Calles*

School of Graduate Studies and School of Technology and Computer Studies, Biliran Province, State University, Naval, Biliran Province, 6541, Philippines

* Corresponding author: Analiza B. Calles, ab.calles@bipsu.edu.ph

ABSTRACT

This study examines the psychological effects of artificial intelligence (AI) in educational settings, with a particular focus on cognitive, behavioral, and social dimensions. Based on interviews with higher education instructors in Biliran Province, Philippines, the findings indicate that although AI tools ease cognitive load by automating repetitive tasks; however, they often lack the depth and contextual relevance necessary for specialized academic subjects. This shortfall may reduce cognitive engagement, as students could become overly dependent on AI-generated content, thereby weakening their critical thinking skills. Behaviorally, the shift toward AI reliance raises ethical concerns, as students are increasingly bypassing independent learning in favor of automated responses, thus threatening academic integrity. On a social level, AI affects student-instructor interactions and intensifies privacy concerns, with participants voicing apprehension about data security and AI-facilitated plagiarism. These findings highlight the importance of balanced AI integration—one that fosters cognitive engagement, upholds ethical academic behavior, and maintains authentic social interaction—to ensure responsible AI use in educational contexts.

Keywords: harnessing AI; content; strategies; instructional purposes; limitations, red flags

1. Introduction

The integration of artificial intelligence (AI) into everyday life has significantly transformed how individuals interact with their environment and carry out responsibilities, evolving from specialized industrial applications into tools that now permeate daily routines[1]. As AI continues to reshape cognitive and behavioral processes, it is increasingly embedded in educational settings, where it adapts to students' learning needs by offering personalized content, feedback, and supplemental resources[2]. However, this growing reliance on AI for cognitive support raises concerns about its broader psychological impacts—particularly across cognitive, behavioral, and social dimensions. In cognitive psychology, AI's role as a tool to alleviate mental strain and foster creativity by automating repetitive tasks is notable. Yet, despite these potential benefits, AI tools also present the risk of cognitive dependency, as students may shift from critical thinking to passive reliance on machine-generated content[3]. Over-dependence on AI may reduce cognitive engagement and undermine students' intrinsic motivation to address complex problems independently[4]. These trends highlighted the dual

cognitive role of AI as both an enhancer and a potential deterrent of learning. Behaviorally, students' interaction patterns with AI tools raise concerns about educational engagement and ethical practices. As AI models gain popularity for their accessibility, they are increasingly used in academic tasks; however, challenges such as data bias, ethical integrity, and the potential for over-reliance on AI-generated assistance underscore the need for structured guidance and limitations in educational applications[5]. AI tools, such as chatbots, often fail to fully replicate the depth of human judgment, sometimes producing responses that can mislead or distort understanding[6]. This behavioral shift emphasizes the need for educators to foster a balanced approach to AI use, one that encourages critical analysis and self-efficacy in students rather than dependency.

On a social level, AI's presence in education also impacts how students collaborate, perceive academic integrity, and interact within learning communities. Concerns about privacy and data security, as well as academic honesty, arise as AI systems integrate deeper into the learning environment[7]. The social implications of AI use in educational settings further reflect the importance of setting boundaries to prevent undermining personal agency and authentic learning experiences among students. Balancing these aspects within educational AI practices is crucial to maintaining a constructive, psychologically supportive learning environment.

This study seeks to explore the psychological implications of AI on students' learning experiences, focusing specifically on cognitive, behavioral, and social aspects. By examining how AI influences cognitive engagement, behavioral patterns, and social interactions in educational settings, the research aims to provide a comprehensive understanding of both the benefits and challenges posed by AI tools in learning environments. Through this analysis, the study hopes to offer insights into how AI can be optimally integrated into educational practices while preserving essential psychological foundations, ultimately guiding educators in fostering balanced and effective AI usage among students

1.1. Operational definitions

To promote clarity and avoid ambiguity throughout the study, several key terms are defined in the context of how they are applied within this research. While the general concepts of artificial intelligence and instructional strategies are widely known, their usage in this study is aligned with the specific ways educators interact with and interpret AI tools in their professional practice.

AI-generated content refers to instructional materials such as texts, summaries, quizzes, or visual resources that are created entirely by an artificial intelligence tool without manual editing or intervention. These are typically produced through platforms like ChatGPT, Google Bard, or similar technologies, and are used as-is by some educators or students.

AI-assisted strategy involves instructional content or teaching approaches that begin with AI-generated suggestions but are thoughtfully refined, adapted, or restructured by educators to fit specific learning goals, classroom contexts, or student needs. These strategies retain elements of AI support while emphasizing human oversight and pedagogical intent.

Instructional strategies, as used in this study, refer to the deliberate methods, approaches, and tools employed by educators to facilitate student learning. This includes how content is presented, how students are engaged, how assessment is conducted, and how learning is supported whether supported by AI tools or not. In this context, it encompasses both traditional and technology-supported practices that aim to improve learning effectiveness.

2. Literature

2.1. Cognitive psychology

Artificial intelligence (AI) systems in education are reshaping cognitive processes, helping students develop skills needed for future work. AI-based learning environments are flexible and adaptive, accommodating diverse cognitive abilities by providing personalized feedback and tailored resources, which fosters enhanced learning outcomes[8]. One key cognitive variable affected by AI is cognitive load—the total mental effort required to process information. Studies show that AI can reduce cognitive load by automating routine tasks, enabling students to focus on complex problem-solving, which supports cognitive efficiency and fosters deeper learning[9]. Additionally, excessive cognitive load or mental fatigue can diminish focus and productivity, highlighting the potential of AI to optimize these cognitive factors by dynamically adjusting content difficulty based on individual performance[10].

Research suggests that while AI assists cognitive functions like memory and attention, it falls short in replicating the nuanced emotional and mental states humans experience. This limitation prompts a call for further integration of cognitive psychology principles into AI to develop systems that can better understand and respond to human emotions[11]. In educational settings, AI has enhanced learning and problem-solving by streamlining cognitive tasks, thus enabling students to reach higher levels of academic engagement and knowledge retention[12].

2.2. Behavioral psychology

AI's influence on behavioral psychology in education raises complex issues, including students' interaction patterns and ethical concerns. As AI technology becomes more accessible, students increasingly rely on AI-driven tools for academic tasks, yet this reliance has sparked debates around ethics and educational integrity[13-15]. Some institutions have responded by restricting AI use, paralleling past controversies over technologies like calculators[16]. Behavioral studies underscore the need to moderate AI use in education to prevent an overreliance that could lead to passive learning, where students bypass critical analysis in favor of AI-generated solutions[17].

Additionally, concerns around accessibility and knowledge gaps are prevalent, as many students lack the necessary training to effectively use AI, which impacts their engagement and learning behaviors[18, 19]. This behavior-oriented perspective calls for clear guidelines and institutional support to ensure ethical use, equal accessibility, and responsible engagement with AI in educational contexts[20,21].

2.3. Social psychology

The integration of AI into educational practices also intersects with social psychology, particularly in areas like self-efficacy, social interaction, and academic integrity. AI's influence on students' social behaviors and their sense of self-control, self-esteem, and personal efficacy has been a focus of recent research[22]. As students increasingly use AI for support, there is concern that it may impact their social skills and confidence in their own abilities. This reliance can lead to reduced self-efficacy if students feel they cannot perform tasks independently without AI assistance, potentially affecting their long-term psychological development in social contexts.

Moreover, data privacy and ethical considerations are critical social concerns. With AI systems collecting vast amounts of student data, questions regarding privacy and data security become prominent. Both students and educators express concerns over data misuse and the need for strict privacy protocols to safeguard personal information[23]. The prevalence of AI-driven plagiarism and academic dishonesty further emphasizes the need for policies that support academic integrity and maintain the authenticity of social and academic interactions

within educational institutions[24]. These insights reveal the necessity for AI applications that are designed not only to support academic success but also to foster a socially healthy and psychologically supportive learning environment.

Many scholars have investigated ChatGPT, assessing its advantages as well as its potential issues[25-27]. However, Shen et al.[28] describe ChatGPT as a double-edged sword, highlighting both its benefits and drawbacks. Ethical challenges[29], privacy issues, and increased anxiety[30] are among the concerns that have garnered public attention.

3. Methodology

3.1. Research design

This study utilized a qualitative exploratory design, guided by the thematic analysis approach proposed by Kiger and Varpio[31], which includes familiarization, generation of initial codes, theme searching, reviewing, defining and naming themes, and reporting. This design facilitated a structured approach to explore the psychological aspects surrounding AI use in instructional contexts, especially in cognitive, behavioral, and social areas, allowing insights into the nuanced perspectives of higher education instructors on the psychological effects of AI in education.

3.2. Population and sampling

The study engaged 15 higher education instructors from Biliran Province, Philippines, selected through purposive sampling. This approach enabled intentional selection based on participants' usage of AI tools and their ability to elaborate on the cognitive, behavioral, and social psychological themes influenced by AI use in teaching. On the psychological effects of AI in education, aligning with the emphasis of Cenerico et al.[32] on purposive sampling.

3.3. Instrument

Semi-structured interviews with open-ended questions were conducted to gather comprehensive insight. This approach enabled participants to freely express their experiences and perceptions regarding the psychological and practical implications of AI on their instructional practices, enabling the collection of nuanced insights into cognitive dependence, behavioral adaptation, and evolving social dynamics resulting from AI use in educational contexts, and social interaction issues due to AI reliance in educational settings[33]. The interview guide was validated by identified experts, yielding a Content Validity Index (CVI) of 0.98. The structure and focus of the interview questions are outlined in **Table 1**, which presents the instrument used in the study. While only one table is provided, the decision to focus on narrative reporting aligns with the qualitative nature of the research.

Table 1. Instrument of the study.

Objective	Interview questions	N
Determine the limitations of AI in content	1. What specific limitations have you encountered development and instructional strategies. when using AI tools for content development in your teaching? 2. How do these limitations impact your ability to deliver effective instruction? 3. Can you share any experiences where AI did not meet your expectations in supporting your teaching strategies? 4. What ethical concerns do you have regarding 40 the use of AI in educational settings. the use of AI in educational content creation?	
Identify potential red flags associated with	5. Have you noticed any instances of bias or misinformation generated by AI tools in your instructional materials? If so, can you provide examples? 6.In your opinion, what practices should educators avoid when integrating AI into their teaching to prevent potential ethical violations?	

3.4. Data gathering

Data was collected through one-on-one interviews with participants, where they discussed personal experiences and observations on AI's impact on their teaching. The open-ended nature of the questions helped capture nuanced psychological insights into how AI tools influence cognitive load management, behavior patterns, and social interactions within instructional settings. It is important to clarify that this study did not employ AI tools in the creation of its instructional strategies, teaching materials, or data analysis. Instead, it investigated the psychological implications of AI usage based on the lived experiences and perspectives of higher education instructors. All mentions of AI-generated or AI-assisted content refer solely to the instructional practices described by the participants during interviews.

3.5. Data analysis

Data analysis followed thematic analysis guidelines which involved the steps of familiarization, initial coding, theme identification, and theme refinement. This analysis framework allowed a systematic exploration of key psychological areas such as cognitive, behavioral, and social aspects highlighted in the interview responses, helping to uncover patterns related to the psychological effects of AI on instructional content development and teacher-student interactions.

3.6. Ethical considerations

The study prioritized confidentiality and ethical use of data, ensuring that participants' responses were anonymized and securely stored. Given the sensitive nature of data related to AI's psychological impact, all measures were taken to protect participants' identities and personal reflections, adhering to ethical standards in educational research and addressing privacy concerns linked to AI technology usage in academic environments

Moreover, ethical considerations extended to the credibility of the content discussed. Since the study deals with AI-generated materials and perceptions thereof, caution was exercised to avoid overgeneralizing participant claims or reinforcing unverified assumptions about AI accuracy. The researcher ensured that interview interpretations were grounded in direct participant experience and contextualized within ethical norms.

4. Results

Research Objectives 1. Determine the limitations of AI in content development and instructional strategies.

Question No. 1. What specific limitations have you encountered when using AI tools for content development in your teaching?

1.1 *Lack of Contextual Understanding*

Six (6) participants expressed that AI tools can sometimes misunderstand the nuances of a specific course or subject, producing content that may appear overly generic or insufficiently aligned with specific instructional objectives. For instance, an AI-generated summary might miss critical details about a theory or misinterpret specific terminology used in the course, making it less useful for advanced topics. Additionally, they mentioned that in technical fields such as the sciences, engineering, ICT or industrial technology, terminology is highly precise. AI tools may struggle to differentiate between complex or closely related terms, which could result in inaccurate explanations or confusing students who rely on the tool for clarification of challenging concepts. In these scenarios, the underlying theme is that while AI tools can assist with content

creation, they often fall short in producing the tailored, nuanced, and context-rich materials that college instructors need for advanced or specialized courses.

> " AI tools can sometimes misunderstand the nuances of a specific course or subject, leading to content that may seem generic or out of alignment with the course objectives."

> "In technical fields such as the sciences, engineering, ICT or industrial technology, terminology is highly precise. AI tools may struggle to differentiate between complex or closely related terms, which could result in inaccurate explanations or confusing students who rely on the tool for clarification of challenging concepts."

1.2 *Quality Control and Accuracy*

Nine (9) participants stated that although AI tools can generate content quickly, the quality often falls short. They emphasized the need for thorough review and editing, as AI may produce factually incorrect, outdated, or overly simplified information. For example, in a Science, Technology & Society course, one participant noted that while the AI-generated report on global trends and issues contained relevant points, much of the data was outdated—over five years old—and omitted recent developments in ICT. Such lapses reveal that AI, while useful for idea generation and drafting, lacks the precision and contextual relevance essential for academic rigor. These shortcomings underscore the importance of human oversight to uphold the standards of accuracy, critical thinking, and subject-specific depth required in higher education.

> "While AI tools can generate content quickly, the quality can vary significantly. There is often a need for extensive review and editing, as AI can sometimes produce factually incorrect or imprecise information."

> "In my Science, Technology & Society course, I asked the AI to generate a report on recent developments in ICT. The tool produced a lot of relevant information, but some of the data was from over five years ago. It missed the recent developments in that are central to our discussions."

Question No. 2. How do these limitations impact your ability to deliver effective instruction?

2.1 *Time-Consuming Review and Editing*

Ten (10) respondents expressed that they use AI to help generate supplementary materials and practice questions for their students. However, the quality of the AI-generated content varies greatly, so they spend a significant amount of time reviewing, editing, and fact-checking. This takes away valuable time they could be spending on direct instruction, personalized feedback, and student engagement. Additionally, they mentioned that the need for constant review and editing reduces the time available for teachers to focus on other instructional activities, such as preparing interactive lessons, conducting discussions, and providing individualized support for students. This can hinder the overall efficiency of course delivery. The time-consuming process of reviewing, editing, and factchecking AI-generated content ultimately detracts from teachers' ability to focus on the core aspects of their instruction, such as engaging with students, facilitating discussions, and providing personalized feedback. The result is an increased workload and a reduction in the quality of both teaching and student learning experiences.

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2.2 *Increased Dependence on Technology*

Seven (7) participants observed that some students rely heavily on AI tools to complete essays or assignments, often using them as a shortcut rather than a support for learning. While AI can aid in brainstorming and idea generation, this dependency can diminish students' critical thinking and analytical skills. Respondents noted that as students increasingly turn to AI for quick answers, their engagement with course material weakens, prompting instructors to invest more effort in promoting independent thought. This growing dependence on AI raises serious concerns about the erosion of essential academic competencies, such as deep analysis and problem-solving—skills fundamental to meaningful learning in higher education.

"I've noticed that some of my students rely heavily on AI tools to generate content for essays or assignments. While it's great for quick brainstorming or generating ideas, I find that they sometimes bypass critical thinking and analysis in favor of the AI's suggestions. This reduces their ability to engage deeply with the course material and develop their own analytical skills."

"The over-reliance on AI tools can discourage students from thinking critically and engaging with course material at a deeper level. As students turn to AI for easy answers, instructors may need to put more effort into fostering independent thinking, which can shift the focus of instruction away from the content itself."

Question No. 3. Can you share any experiences where AI did not meet your expectations in supporting your teaching strategies?

3.1 *Lack of Alignment with Course Objectives*

Five (5) participants shared that they used AI to generate reading comprehension quizzes general education classes, but the outputs often lacked academic depth. The questions were frequently too simplistic or misaligned with the intended focus, failing to address deeper themes or literary devices discussed in class. As a result, instructors had to revise and rewrite the quizzes to align them with course outcome consuming time that could have been spent on more engaging or personalized teaching activities. These experiences underscore a key limitation: while AI offers convenience, it often struggles to meet the nuanced and rigorous demands of advanced coursework. Instructors are compelled to invest additional effort to ensure AI-generated materials uphold academic standards, which can detract from more impactful instructional practices.

"I tried using AI to generate reading comprehension quizzes for my literature class. However, the questions were often too simplistic or completely off-base in terms of what I wanted my students to focus on. The AI didn't understand the deeper themes or literary devices we were analyzing in class, and the quizzes lacked the necessary academic rigor."

" The AI-generated content didn't align with the specific learning goals of the course. As a result, I had to spend extra time adjusting and re-writing the quizzes to better reflect the course objectives. This took away from the time I could have used

to prepare more interactive class activities or provide personalized feedback to students."

3.2 *Difficulty in Maintaining Personalization*

Ten (10) participants reported that while AI tools were initially expected to support personalized learning in large introductory courses, the results fell short. Although AI could produce general content, it failed to adapt to students' individual needs, past performance, or specific struggles. For instance, it did not detect when a group was consistently challenged by a concept, nor did it provide targeted support. As a result, instructors had to continue offering manual interventions, limiting scalability and increasing their workload. These insights reveal a critical gap—AI lacks the responsiveness and depth needed to personalize instruction, making it inadequate for addressing diverse learning styles and evolving academic needs.

> "I hoped that AI would help me create personalized study materials for my students in a large introductory course. While it did provide general content, it lacked the nuance to tailor resources to specific students' needs based on their past performance or questions."

> " AI's inability to generate truly personalized content meant that I had to continue providing individualized help manually. This made it difficult to scale the support I wanted to give to all students, particularly in a large class where individual attention is limited."

Research Objectives 2. Identify potential red flags associated with the use of AI in educational settings.

Question No. 1. What ethical concerns do you have regarding the use of AI in educational content creation?

1.1 *Data Privacy and Security*

Nine (9) participants expressed concerns about the data privacy risks associated with AI tools in education. These platforms often require students to input personal information, academic work, and behavioral data, raising the risk of misuse if not properly secured. Respondents highlighted that much of this data is processed by third-party vendors, prompting questions about confidentiality, ownership, and control. Students have also become increasingly uneasy about surveillance, lack of transparency, and limited authority over their own data. These concerns point to an urgent need for clear policies, stronger security protocols, and greater accountability to ensure that AI use in education protects student privacy and upholds ethical standards.

> "AI tools often require students to input personal data, assignment details, and even written work. I worry about the security and privacy of that data. If these tools are not properly secured, there's a risk that sensitive student information could be exposed or misused."

> " The use of AI in educational settings often involves collecting data on students' performance, behavior, and interactions. There are concerns regarding the confidentiality and security of that data, especially if it's stored or processed by third-party vendors, raising questions about how student information is protected."

1.2 *Academic Integrity and Plagiarism*

Eight (8) participants expressed concern that AI-generated content may tempt students to bypass genuine learning by using it to complete assignments, essays, and even research papers. The sophistication of AI outputs makes it difficult to verify authorship, raising serious issues of academic dishonesty. Respondents

emphasized that this growing reliance on AI risks undermining academic integrity, as students may prioritize convenience over critical thinking and originality. The prevalence of plagiarism and superficial engagement with course material highlights a shift from learning to grade optimization. These concerns call for stricter monitoring, clear academic guidelines, and ongoing dialogue about the ethical implications of AI use in education.

> "One of my main concerns is that AI-generated content might encourage students to bypass learning and simply use AI to produce assignments, essays, and even research papers. AI tools can generate sophisticated texts that may make it hard to discern whether the work is truly the student's own, leading to potential academic dishonesty."

> " The widespread use of AI in content creation raises concerns about plagiarism and the erosion of honest academic effort. It becomes challenging to ensure that students are engaging with course material authentically rather than relying on AI tools to complete assignments without true learning."

No. 2. Have you noticed any instances of bias or misinformation generated by AI tools in your instructional materials? If so, can you provide examples?

2.1 Bias in Historical Contexts

Four (4) participants highlighted that AI-generated summaries of historical events often reflected biased perspectives, omitting crucial context and opposing viewpoints. In one instance, a summary of a conflict was overly one-sided, potentially misleading students into viewing complex issues in overly simplistic terms. Respondents noted that such imbalances required them to revise the material to ensure a more accurate and nuanced representation. This not only added to their workload but also highlighted the risk of students accepting AI outputs as authoritative without engaging in critical analysis. The experience underscores the need for careful review of AI-generated historical content to prevent the reinforcement of biased narratives in education.

> "I used an AI tool to generate a brief overview of historical events for my students. One of the summaries contained a description of a particular conflict that was heavily skewed towards one perspective, omitting significant details from the opposing side. The AI didn't capture the complexity of the situation and ended up presenting a one-sided view that could mislead students into thinking the historical events were more black-and-white than they actually were."

> "The AI-generated content failed to provide a balanced view of a historical event, omitting important context and nuances. This could lead students to misinterpret the event, as they might assume the AI's version is an authoritative account without recognizing the need for critical analysis of different viewpoints."

2.2 Inaccurate Scientific Information

Eleven (11) participants mentioned that they used AI to help generate a list of key concepts and definitions for a science course. While most of the content was helpful, there were several instances where the AI tool provided incorrect or outdated scientific information, particularly regarding recent discoveries or theories. For example, it listed a theory that had been debunked years ago as still being valid. The AI-generated list included outdated scientific theories, such as a now refuted model of the atom, and failed to account for recent advances in scientific understanding. Additionally, they expressed that they have to go through the AI-generated material

and cross-check it with up-to-date sources. This meant additional work to ensure that students were receiving accurate and current information, and it highlighted the limitations of relying on AI for technical subjects that require precise, fact-checked data.

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Question No. 3. In your opinion, what practices should educators avoid when integrating AI into their teaching to prevent potential ethical violations?

3.1 Over-Reliance on AI for Content Creation

Six (6) participants mentioned that one thing they have caution against is using AI to generate large portions of course content, like lectures, assignments, or quizzes, without thoroughly reviewing and adapting it. While AI tools can save time, they don't fully understand the nuances of your course objectives or the needs of your students. Over-relying on AI to produce materials could lead to content that is too generic, lacks critical depth, or is biased in ways you might not notice right away. Additionally, they indicated that relying heavily on AI for content generation without substantial oversight. AI-generated materials should not replace the instructor's direct involvement in content creation, as this could lead to inaccurate, superficial, or misaligned course materials. This could compromise the quality and accuracy of instruction, and lead to the unintentional dissemination of biased or misleading information.

> "One thing I'd caution against is using AI to generate large portions of course content, like lectures, assignments, or quizzes, without thoroughly reviewing and adapting it. While AI tools can save time, they don't fully understand the nuances of your course objectives or the needs of your students. Over-relying on AI to produce materials could lead to content that is too generic, lacks critical depth, or is biased in ways you might not notice right away."

> "Relying heavily on AI for content generation without substantial oversight. AIgenerated materials should not replace the instructor's direct involvement in content creation, as this could lead to inaccurate, superficial, or misaligned course materials."

3.2 Using AI Without Considering Data Privacy

Eight (8) participants expressed that they need to be extremely cautious when using AI tools that require students to input personal data, assignment details, or other sensitive information. AI tools may not always guarantee data protection or privacy. If students' data is collected, stored, or misused by third-party vendors, it could violate ethical standards related to data privacy and security. Additionally, they mentioned that using AI tools that require students to submit personal information or academic data without ensuring that these tools adhere to strict data privacy and security standards. Breaching student confidentiality or exposing them to risks

of data misuse or unauthorized access could lead to serious ethical violations and undermine trust between students and educators.

> "We need to be extremely cautious when using AI tools that require students to input personal data, assignment details, or other sensitive information. AI tools may not always guarantee data protection or privacy. If students' data is collected, stored, or misused by third-party vendors, it could violate ethical standards related to data privacy and security."

> " Using AI tools that require students to submit personal information or academic data without ensuring that these tools adhere to strict data privacy and security standards."

3.3 Allowing AI to Replace Meaningful Student Engagement

Five (5) participants indicated that AI should be used as a tool to enhance learning, not to replace human interaction and meaningful student engagement. It's tempting to let AI handle administrative tasks, like grading or feedback, but this could remove the personal touch that helps students feel supported and seen. AI-generated feedback may lack the empathy or nuance that a human instructor can provide. Additionally, they mentioned that they need to avoid using AI to replace personal engagement with students, such as providing automated feedback without the instructor's involvement, or substituting AI for in-person or live communication. Over-reliance on AI for feedback or engagement could lead to a dehumanized learning experience, where students feel like they're interacting with algorithms rather than educators invested in their success.

> "AI should be used as a tool to enhance learning, not to replace human interaction and meaningful student engagement. It's tempting to let AI handle administrative tasks, like grading or feedback, but this could remove the personal touch that helps students feel supported and seen. AI-generated feedback may lack the empathy or nuance that a human instructor can provide."

> "We need to avoid using AI to replace personal engagement with students, such as providing automated feedback without the instructor's involvement, or substituting AI for in-person or live communication."

5. Discussion

This study's discussion explores the psychological impacts of artificial intelligence (AI) in educational settings, focusing on cognitive, behavioral, and social dimensions. AI tools are widely acknowledged for reducing cognitive load by automating routine tasks, allowing educators more time for other instructional responsibilities. However, as participants noted, AI-generated content frequently lacks the accuracy and contextual awareness essential for teaching specialized subjects, thereby increasing the burden on educators, leading to increased time spent on review and editing. This limitation challenges educators' ability to maintain high standards and risks diminishing students' cognitive engagement, as reliance on AI may encourage passive learning and reduce critical thinking. Cognitive psychology research highlights the importance of active learning for developing analytical skills, which overreliance on AI tools may hinder[34-36].

Behavioral shifts have also emerged due to students' growing dependence on AI for quick solutions. Many students may rely on AI-generated responses for assignments, potentially bypassing meaningful engagement with content. This behavioral change raises ethical concerns, as AI-facilitated shortcuts challenge the

development of independent learning and disciplined study habits. Behavioral psychology suggests that passive consumption associated with heavy AI use may hinder students' development of critical academic behaviors[37]. Research further indicates that, despite the benefits of AI, it presents ethical challenges related to algorithmic bias, privacy, and human decision-making[38-42].

Social implications also arise, as AI impacts the dynamics of student-instructor relationships and the broader academic environment. Participants expressed concerns that AI's impersonal nature might erode trust and reduce meaningful student engagement, as students increasingly interact with automated responses over personalized feedback. Privacy concerns complicate this issue, as AI systems often process and store personal information, raising questions about data security and ethical practices[43]. Additionally, the ease with which AI facilitates plagiarism poses risks to academic integrity, potentially normalizing dishonest practices and undermining students' sense of responsibility[44]. Social psychology emphasizes the importance of genuine interpersonal interactions and trust in educational environments, both of which may be compromised by an overreliance on AI[45].

AI provides valuable support in educational contexts, thoughtful integration is essential to prevent it from undermining cognitive engagement, ethical behavior, and social authenticity. By setting boundaries and promoting responsible AI usage, educators can support a balanced approach that preserves the core psychological elements crucial for effective teaching and learning.

6. Conclusion

The study highlights the multifaceted psychological implications of AI integration in educational settings. AI tools offer clear advantages by reducing cognitive strain and enabling educators to manage routine tasks more efficiently. However, participants noted that these benefits are counterbalanced by limitations in AI's ability to produce content that meets the complex demands of specialized subjects, often requiring additional human oversight to ensure accuracy and relevance. Furthermore, as students increasingly rely on AI-generated content, there is a noticeable shift away from independent critical thinking, which is vital for cognitive development and academic integrity. This trend highlights the importance of encouraging students to engage actively with instructional content rather than relying predominantly on AI-generated outputs.

On a behavioral level, the ease of access to AI tools has led to ethical challenges, with students sometimes bypassing active engagement in favor of automated responses. This shift highlights the importance of fostering independent learning behaviors that prioritize genuine understanding over convenience. The social implications of AI are equally profound, as its impersonal nature may weaken student-instructor relationships and raise concerns regarding data privacy and academic honesty. These social dynamics reflect the importance of establishing guidelines to maintain a balanced, psychologically supportive educational environment.

This study is limited by its qualitative design, focusing solely on instructors within one province, which may constrain the generalizability of findings. Additionally, the absence of quantitative triangulation limits the ability to statistically validate emerging themes. Future studies may explore student perspectives on AI use or employ mixed-method approaches to validate the psychological impact of AI on cognitive engagement and ethical behavior. Longitudinal studies could also reveal how student-AI relationships evolve over time.

Conflict of interest

The author declares no conflict of interest.

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