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EFL Students' Perceptions on the Integration of AI in Fostering Critical Thinking Skills

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ABSTRACT

A developing discussion over the effects of Artificial Intelligence (AI) on students' critical thinking skills has emerged with their introduction into the classroom. Even if AI can provide several advantages, some worries depending too much on these technologies could impede the growth of critical thinking abilities. This research aims to analyze how students perceive the influence of AI on their critical thinking abilities. This research is descriptive qualitative research that involves collecting data from direct interviews. The respondents are 15 (fifteen) students from the English Literature study program, Letter Faculty, Sawerigading University Makassar. The research found that students perceive the following impact of AI use on their critical thinking abilities: 1) Hindering the development of critical thinking skills. 2) Assisting in the retrieval of information, data analysis, and the resolution of everyday issues. 3) Causing dependence on technology. 4) Helping to evaluate the information quickly; 5) Exploring alternative ideas; and 6) Improving reasoning ability. Overall, we need to balance the use of AI while prioritizing students' critical thinking. It is important to encourage students to use AI responsibly and judiciously, while also emphasizing the importance of critically evaluating the information provided by AI systems.

1. INTRODUCTION

The rapid advancements in Artificial Intelligence (AI) technology have significantly impacted various aspects of our lives, including the education sector. As AI-powered tools and applications become more prevalent in classrooms, it is crucial to understand how students perceive the influence of AI on their critical thinking abilities. Critical thinking is a fundamental skill that enables individuals to analyze, evaluate, and make informed decisions (Dwyer et al., 2014; Facione, 2011; Hanscomb, 2023). It is a crucial aspect of learning and problem-solving, and its development is a key objective in many educational systems. The development of critical thinking skills is considered essential for success in academic, professional, and personal contexts, as it enables individuals to navigate complex situations, make well-informed decisions, and adapt to changing environments (Facione, 2011). However, the integration of AI in the learning process raises concerns about its potential impact on students' critical thinking skills.

The rise of AI-powered tools and applications in education has sparked a growing debate about their impact on students' critical thinking abilities. While AI can offer various benefits, such as personalized learning, improved accessibility, and enhanced educational experiences, there are also concerns that overreliance on these technologies may hinder the development of essential critical thinking skills (Holmes et al., 2022; Muthmainnah et al., 2022; Vinh et al., 2024). Critical thinking is

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widely recognized as a vital competency for success in the 21st century (Isma et al., 2023). It involves the ability to analyze information, question assumptions, evaluate evidence, and make reasoned judgments. This skill set is crucial for problem-solving, decision-making, and adapting to complex and rapidly changing environments.

Existing research has examined the influence of technology on teaching and learning processes. Studies have shown that the effective integration of technology in the classroom can support the development of critical thinking skills when used in a purposeful and pedagogically sound manner (Isma et al., 2024; Mejia & Sargent, 2023; Ong & Annamalai, 2023). However, the unique characteristics of AI-powered tools, such as their ability to automate certain cognitive tasks, have raised questions about their potential impact on critical thinking. Some scholars have also suggested that the use of AI in education may lead to a decline in students' critical thinking abilities if not implemented carefully (Darwin et al., 2024; Walter, 2024). Concerns have been raised that AI could encourage passive learning, reduce the need for independent reasoning, and discourage students from engaging in the cognitive processes that are essential for critical thinking (Darwin et al., 2024). On the other hand, proponents of AI in education argue that these technologies can enhance critical thinking by providing personalized feedback, facilitating collaborative learning, and freeing up time for more in-depth exploration and analysis (Darwin et al., 2024; Walter, 2024). The integration of AI-powered tools may also enable students to focus on higher-order thinking skills while delegating more routine tasks to the technology. To better understand the impact of AI on students' critical thinking, it is crucial to examine the perceptions and experiences of the primary stakeholders – the students themselves.

Several studies have specifically examined the impact of AI on education such as: first, Darwin et al. (2024) entitled Critical Thinking in the AI Era: An Exploration of EFL students' perceptions, benefits, and limitations. The findings revealed a complex view of critical thinking that involves questioning norms, analyzing context, and evaluating evidence. Second, Dwivedi et al. (2021) in the research entitled Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. The review paper discusses the potential risks of AI, including the possibility of AI undermining critical thinking, creativity, and problem-solving skills among students. Lastly, Luckin & Holmes (2016) in their paper entitled Intelligence Unleashed: An Argument for AI in Education. This report explores the potential benefits of AI in education but also acknowledges the need to ensure that the use of AI reinforces rather than replaces critical thinking skills. These studies and reports suggest that AI can offer valuable support in educational settings. Careful implementation and a balanced approach are necessary to harness the benefits of AI while ensuring the development of essential cognitive skills.

Based on the background above, the researchers are interested in conducting the research. This research aims to analyze students' perceptions of the impact of AI use on their critical thinking ability. There are several compelling reasons why it is important to research students' perceptions of the impact of AI use on their critical thinking abilities. First, students are the primary users and stakeholders of AI-enabled educational technologies. Their perceptions and experiences provide valuable insights that can inform the design and implementation of these technologies. Then, if students perceive that AI is negatively impacting their critical thinking skills, it could have implications for their overall learning, academic performance, and the development of essential 21st-century competencies. Next, research on students' perspectives can help identify the specific ways in which AI may be supporting or hindering the development of critical thinking skills. This can inform more responsible and effective integration of AI in educational settings. Finally, exploring students' perceptions can help uncover any concerns or misconceptions they may have about the impact of AI on their learning and cognitive abilities. This information can guide the development of appropriate support and training for students.

By conducting this comprehensive study, researchers can gain valuable insights that can inform the responsible and effective integration of AI in educational contexts, ultimately supporting the holistic

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development of students' critical thinking skills. By investigating how students perceive the influence of AI on their critical thinking abilities, educators and policymakers can make informed decisions about the effective integration of these technologies in educational settings. In addition, this study adds to the existing body of literature by focusing specifically on EFL students' perceptions of AI's impact on critical thinking. Unlike previous studies, this research provides a student-centered view from an underexplored demographic, offering insights relevant to educators and policymakers seeking to integrate AI thoughtfully in language education. It is hoped that the findings can inform the development of strategies and policies that leverage the benefits of AI while safeguarding the cultivation of critical thinking abilities in the next generation of learners.

2. METHODS

This research is descriptive qualitative research that involves collecting data from direct interviews (Yin, 2018). The respondents are 15 (fifteen) students of the English Literature study program, Letter Faculty, Sawerigading University Makassar. The interview consisted of a question about their learning experience with AI and its influence on their critical thinking. By taking students as respondents from different cultural backgrounds in the same study program, it is expected that their opinions can be represented from different backgrounds and perspectives (Creswell & Creswell, 2017). The analysis of the interview results was done in a descriptive manner using a qualitative approach (Denzin et al., 2023). The selection of qualitative research methods is hampered by the great possibility of the researchers presenting the results in detail, and comprehensively (Patton, 2014). The qualitative descriptive method aims to describe the variables that are usually in the form of social phenomena in detail related to the influence of the use of AI on the critical thinking ability of students in the English Literature study program, Letter Faculty, Sawerigading University Makassar.

3. FINDINGS AND DISCUSSION

Based on the direct interview with 15 students related to their perception of the impact of AI use on their critical thinking ability, the following results were obtained:

3.1 Hindering the development of critical thinking skills

Most students are aware of the potential of AI in helping learning processes and improving study efficiency. However, they are also concerned that overuse of AI can impede the development of critical thinking skills. Critical thinking often involves the ability to break down complex problems, analyze information from multiple perspectives, and develop original solutions. The fear is that students may become passive consumers of AI-generated information rather than actively engaging in the learning process. Respondents' answers can be seen below:

> *I think that if students count on AI too much to solve their task problem, they will lose the learning experience of working through challenges on their own, which is crucial for developing critical thinking abilities (R6).*

> *I agree that when AI-powered tools provide ready-made answers or solutions, students may become less inclined to explore and investigate topics in-depth (R11).*

Findings show that while students recognize AI's efficiency in information retrieval, many feel it risks reducing critical thinking engagement, a sentiment echoed in McNamara et al. (2013) regarding AI feedback on student writing. These results imply that educators need to scaffold AI use with tasks requiring critical evaluation, ensuring that AI aids rather than replaces higher-order thinking. The researchers noted that the AI feedback, while accurate, often lacked the contextual understanding and higher-order thinking that an experienced human instructor would provide. Students became

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accustomed to addressing only the specific issues flagged by the AI, rather than critically evaluating the overall structure, reasoning, and rhetorical effectiveness of their writing (Ismail et al., 2017). This could potentially lead to a decline in intellectual curiosity and a reduced motivation to actively engage with course material. Students need to develop the ability to critically evaluate the sources and reliability of information. If they rely too heavily on AI-generated content without understanding its limitations or potential biases, they may struggle to distinguish between credible and questionable information, which is an essential critical thinking skill.

To address these concerns, educational institutions need to strike a balance between the use of AI-powered tools and the development of critical thinking skills. This may involve incorporating AI-assisted learning in a way that complements and enhances, rather than replaces, the traditional learning processes that foster critical thinking, problem-solving, and independent learning. Educating students on the appropriate use of AI, as well as emphasizing the importance of critical evaluation and hands-on problem-solving, can help mitigate the potential risks associated with over-reliance on AI in the learning environment (Shum & Luckin, 2019; Wang et al., 2023).

3.2 Helping in accessing information, analyzing data, and solving routine problems

Students argue that AI can help in accessing information, analyzing data, and solving routine problems. However, they remain convinced that critical thinking skills such as deep analysis, evaluation of arguments, and synthesis should be developed independently. It can be described by the respondents' answers as follows:

> *AI as far as I know, AI can provide students with quick and efficient access to a vast amount of information on any given topic. This can help me as a student to find relevant sources and data quickly to support their learning and research (R2).*
>
> *I use AI to analyze big datasets of my paper and identify the figurative meaning of the literature work that I read, trends, and insights that are very difficult for me to detect on my own. This can be particularly useful for tasks such as data analysis, visualizing complex data, and drawing informed conclusions (R4).*
>
> *As a student of English Literature study program, I use AI to solve certain types of routine or repetitive problems, such as language translations, or code debugging. By automating these types of tasks, I can save my time and focus my efforts on more complex and critical thinking-based activities (R7).*
>
> *In my point of view, AI learning systems can help me in analyzing the performance of my paper draft, my learning style, and all of the knowledge gaps in providing personalized recommendations, feedback, and support of my paper. This can help me to overcome specific challenges and optimize my learning experience (R12).*

However, as mentioned in the previous response, it is crucial to maintain and to make sure ensure that the use of AI does not diminish the development of critical thinking skills. AI should be used as a tool to enhance and supplement learning, not replace the essential cognitive processes that are crucial for long-term success (Chen et al., 2023; Shum & Luckin, 2019). The important point is to encourage students to use AI responsibly and judiciously, while also emphasizing the importance of critically evaluating the information and insights provided by AI systems. By striking this balance, students can leverage the benefits of AI while still developing critical thinking, problem-solving, and independent learning abilities that will serve them well in their academic and professional pursuits.

3.3 Causing dependence on technology

Some students were concerned that overuse of AI could make them more dependent on technology and less capable of developing strong critical thinking skills. They stressed the need to maintain a

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balance in the use of AI and maintain a high level of thinking. This can be seen from the respondents' answers below:

> *Let me give the example first, where a student is tasked with writing a research paper on a historical topic. Instead of carefully reading through source materials, evaluating different perspectives, and synthesizing the information into a well-reasoned argument, the student simply relies on an AI writing assistant to generate the paper (R8).*
>
> *I think that AI tool may be able to produce coherent and grammatically correct text, pulling relevant facts and quotes from online sources. However, the student has not engaged in the deep contemplation, analysis, and original thinking required to truly understand the subject matter (R9).*
>
> *In my opinion, over time, if the student continually defers to the AI for research, writing, and even problem-solving, they may become increasingly reliant on the technology. They may lose the ability to formulate their own ideas, critically evaluate information, and construct persuasive arguments independently (R10).*

From the respondents' answers, it can be seen that this over-dependence on AI could undermine the student's development of crucial critical thinking abilities, such as: conducting thorough, independent research, evaluating the validity and reliability of sources, identifying biases and alternative perspectives, synthesizing information into original, insightful arguments, and defending their positions with well-reasoned logic. The concern is that this over-reliance on AI could become a habit that persists even after the student leaves the educational setting, hindering their ability to think critically and solve complex problems in the real world.

To cope with this problem, it's important to strike the right balance between using AI as a tool to enhance and augment human capabilities, while still preserving core critical thinking skills. AI should complement and empower human intelligence, not replace it entirely (Chen et al., 2023; Shum & Luckin, 2019). There is a valid concern that over-reliance on AI could lead to a decline in human critical thinking abilities. Students need to be actively engaged in the learning process, not simply deferring to AI for answers. Instructors should design curricula that require students to analyze, evaluate, and synthesize information rather than just recall facts. AI should be leveraged to enhance human cognition, not replace it. AI can be incredibly powerful for tasks like information retrieval, data analysis, and routine problem-solving. But it should be used judiciously, with humans still responsible for higher-order reasoning, creativity, and decision-making. As AI systems become more complex, they must remain transparent and explainable. Students should understand how AI models arrive at their outputs, so they can critically evaluate the reasoning and not simply accept AI-generated answers at face value. Educators should focus on developing students' metacognitive skills - their ability to think about their thinking processes. This empowers students to monitor their learning, adjust their strategies, and engage in deeper, more reflective reasoning. The key is finding the right balance and using AI as a tool to augment rather than replace human intellect. With the right approach, AI can enhance critical thinking rather than diminish it, but this requires careful design of curricula and instructional methods.

3.4 Helping to evaluate the information quickly

However, some students see the potential of AI in supporting critical thinking, for example by helping to evaluate the information quickly. One way AI can support critical thinking is by assisting with the rapid evaluation of large amounts of information. As the volume of available data continues to grow exponentially, it becomes increasingly challenging for humans to thoroughly review and analyze all relevant sources. One of the core challenges in today's information-saturated world is keeping up with the sheer volume of available data. Students are often tasked with researching complex topics, but sifting through countless websites, articles, and other sources can be overwhelming and time-consuming. AI systems can assist by quickly scanning through these information sources, and identifying key facts,

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arguments, and insights. This allows the human to focus less on the arduous process of information gathering, and more on critically analyzing and synthesizing what they've found. Here are some respondents' arguments:

> *As our study program insisted us as the students to read all kind of information from many data resources, so I myself utilized AI-powered search engines and recommendation to surface the most relevant and reliable sources for a given query. I use AI text summarization tools also to provide concise overviews of long articles or reports and I use AI knowledge graphs as it can visually map out interconnections between concepts and data point to finish my assignment (R4).*
>
> *I think that AI-assisted information processing can actually improve comprehension and retention of the material. I say so because when students do not have to spend as much time hunting down and sifting through sources, they can devote more cognitive resources to deeply engaging with the content (R9).*
>
> *I agree that AI-powered reading assistant were better able to identify key takeaways and accurately answer comprehension questions. The AI tool that I used allowed me to quickly survey the main points before diving into more detailed analysis (R14).*
>
> *As what I always use, the real-time feedback and personalized guidance provided by AI tutoring systems have been demonstrated to help me correct my misconceptions and solidify my understanding as I work through problems (R22).*

Based on the students' experience and opinions above, it's clear that the students have been able to leverage various AI-powered tools and technologies to great effect in their studies. The examples they provided demonstrate how AI can augment and enhance critical thinking skills, rather than diminish them as some may fear. This is in line with Khan et al. (2023) who stated that by utilizing AI-powered search engines, recommendation algorithms, text summarization tools, and knowledge graphs, many students have been able to quickly surface the most relevant and reliable information sources for their research assignments. This has freed up their cognitive resources to focus more on deeply engaging with the content, evaluating different perspectives, and formulating their insights - the hallmarks of critical thinking. Chen et al. (2023) also supported this finding by emphasizing that the AI system allowed the students to quickly survey the key points, which then enabled deeper engagement with the material.

3.5 Exploring alternative ideas

One potential avenue to consider is how AI could be used to assist students in developing their own original ideas and creative problem-solving skills, rather than just helping them complete homework assignments. For example, AI could be used to provide personalized learning recommendations and prompts to challenge students to think outside the box, help students analyze complex problems from multiple angles and generate alternative solutions, engage students in generative exercises to spark new ideas and inspiration and offer constructive feedback on the originality and creativity of student work. This explanation is supported by the following responses of the students related to their perspective toward the use of AI and its relation to students' critical thinking.

> *Based on my own experience, I really like to use AI-powered ideation and brainstorming tools. AI-powered ideation and brainstorming tools help me in generating novel ideas and concepts by drawing connections between disparate pieces of information (R1).*
>
> *I like to use chatbots. It is my favorite application. It helps me more with my task from the lecturer. Chatbots can engage me in open-ended brainstorming sessions. These chatbots are trained on vast datasets of information and can dynamically generate novel connections and thought-provoking questions to stimulate my ideation process (R16).*

The respondents' answers above support research published in the Journal of Mechanical Design found that an AI-powered ideation tool called Idea Expander was able to help engineers explore a wider

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range of alternative solutions compared to unaided ideation (Siangliulue et al., 2016). The AI system drew upon a large database of existing products and technologies to surface unexpected analogies and combinations that human engineers may have overlooked.

By providing this diverse set of alternatives, AI can encourage users to think beyond the obvious or most conventional solutions. This can be particularly valuable in creative tasks, problem-solving, and even academic research, where exploring a wide range of possibilities is key to discovering innovative breakthroughs. Of course, the human user still plays a critical role in evaluating, refining, and ultimately selecting the most promising ideas generated by the AI. However, the AI's ability to rapidly ideate and make unexpected connections can be a powerful complement to human creativity and lateral thinking. So, in summary, AI-powered ideation tools represent one way that the technology can assist in broadening perspectives and uncovering alternative approaches - a valuable capability in academic, professional, and personal contexts that require innovative thinking.

3.6 Improving reasoning ability

AI can help in improving reasoning abilities. There are some reasons why AI systems can be beneficial in enhancing human reasoning. Many AI systems are trained on enormous datasets spanning diverse fields of knowledge. This allows the AI to draw upon a much more comprehensive base of information compared to any individual human. By tapping into this expansive knowledge, AI can surface relevant facts, patterns, and analogies that can stimulate new lines of reasoning and uncover connections that a human may have overlooked. While humans excel at creative, context-dependent reasoning, AI can assist by automating certain logical, data-driven, and computational aspects of the reasoning process. By combining human and AI reasoning abilities, individuals and teams can leverage the strengths of both to enhance the overall quality and effectiveness of their reasoning. The response below shows the data gained from the respondents related to the benefit of AI in improving students' reasoning ability.

> *I see that AI systems can rapidly generate and evaluate multiple hypotheses or alternative solutions to a given problem. This allows me to quickly explore a wider solution space. Humans, on the other hand, may sometimes fixate on the first reasonable solution that comes to mind, without necessarily considering other potentially better options (R1).*

> *I always think that the feedback and explanations provided by AI can help me and other friends to identify flaws or gaps in our reasoning, leading to improved metacognitive skills and more rigorous, evidence-based thinking (R7).*

The opinions above show that the integration of AI into reasoning-intensive tasks can expand the breadth of information and perspectives available, accelerate the exploration of alternatives, and provide impartial feedback - all of which can enhance human reasoning abilities in powerful ways. This finding is in line with the previous research found that AI agents can help human teams consider a broader set of solution possibilities by drawing connections across diverse knowledge domains (Leung et al., 2018). A paper also demonstrated that AI-driven ideation tools can help individuals generate a larger and more diverse set of potential solutions to complex problems, compared to unaided human ideation (Siangliulue et al., 2016).

4. CONCLUSION

Based on the research results above, it can be concluded that students perceive the following impact of AI use on their critical thinking abilities: 1) Hindering the development of critical thinking skills; 2) Assisting in the retrieval of information, the analysis of data, and the resolution of everyday issues; 3) Causing dependence on technology; 4) Helping to evaluate the information quickly; 5) Exploring

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alternative ideas; and 6) Improving reasoning ability. Based on the research results, we need to balance the use of AI while prioritizing the development of students' critical thinking skills. AI can help in accessing information, analyzing data, and solving routine problems, but it should not hinder students' ability to think independently and develop their reasoning powers. 2) Good education and assistance are needed to prevent students from becoming too dependent on AI technology. The use of AI must be balanced with students' ability to evaluate information, explore alternative ideas, and maintain their reasoning abilities. 3) The use of AI among students should be directed at helping increase efficiency and productivity, not replacing students' critical and analytical thinking abilities. AI can be a tool that facilitates the learning process, but it should not dominate it. 4) Educational institutions must provide appropriate supervision and policies for integrating AI into the campus environment. It is important to ensure that AI is used wisely and to develop student competencies. Overall, the hope for the future is that the use of AI among students can provide added value and support the development of students' critical thinking, analytical, and creative abilities, rather than hindering them.

It is important to address some limitations of this research such as 1) Limited scope: This research may only be conducted at one institution or a specific group of students, so caution should be exercised when generalizing the results to the entire student population; 2) Limited perspective: This research only investigates student perceptions and does not necessarily include the views of lecturers, policymakers, or other stakeholders involved in the use of AI in academic environments; 3) Qualitative impact measurement: This research investigates student perceptions and views more qualitatively. Further research is needed to quantitatively measure the impact of using AI, such as through tests of critical thinking skills or other academic performance indicators; 4) Rapid technological development: Considering the very rapid development of AI technology, the results of this research may no longer be relevant to current conditions. Further research is needed that considers recent advances in AI technology. Other influencing factors: Apart from the use of AI, many other factors can influence students' critical thinking abilities, such as teaching methods, curriculum, learning motivation, etc. Future research needs to integrate these various factors. Given these limitations, it is hoped that further research can provide a more comprehensive and reliable picture for developing appropriate AI strategies in the academic environment.

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