| **Research Article**

The Impact of AI on Students' Creative Thinking: FLDM as a Case Study

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| **ABSTRACT**

Nowadays, it is more evident than ever before that soft skills are a predisposition for graduates to smoothly settle in and excel in the workplace. Soft skills involve a multitude of skills, one of which is creative thinking. This parallels with incredibly unprecedented technological innovation (AI), redefining the skills needed in the twenty-first century and their development. Within this realm, the primary aim of this paper is to explore students' perceptions of harnessing the power of artificial intelligence for creative thinking development. To do so, this study utilizes a qualitative research design to capture a holistic view and in-depth understanding of the topic under scrutiny. The collected data were analyzed using thematic analysis, which allowed for the identification of themes and subthemes based on students' perceptions. The present study revealed that AI does impact creative thinking development at the investigated levels, namely ideation, elaboration, and originality. However, the participants expressed some concerns regarding the potential side effects of AI, particularly when misused. These findings can inform AI-related interventions, which seek to use AI for soft skills development, in higher education. Besides, unveiling students' perceptions of AI use for creative thinking development would inarguably offer critical insights for educators and decision-makers.

| **KEYWORDS**

Artificial intelligence, creative thinking, creative thinking development, transversal skills, higher education

1. Introduction

Higher education institutions have been asked to provide students not only with technical knowledge associated with their field of study or discipline, but also with competencies that can help them manage any situation in different contexts, be it related to their studies or not. These competences are what the literature refers to as "transversal competences". Transversal competences take their name to express that they are not exclusive or limited to a certain context. These skills are necessary for effective action-taking in any context, be it job, academic discipline, civic or community engagement, etc (Hart et al., 2021). Various other names are used to refer to transversal competences, particularly interdisciplinary skills, life skills, 'soft skills', and most recently '21st century skills'; the latter term reflects the necessity to equip young people to face the challenges of the new millennium (Council of Europe, 2021).

The literature has mentioned a number of competences, such as critical thinking, emotional intelligence, and problem solving, among others. This study aims to investigate a specific transversal competence, that is, creative thinking. According to Jackson et al. (2012) and Yao et al. (2024, creative thinking is a way of thinking through which applicable, unique, and novel ideas and products are generated by individuals. It is the production of new concepts and solutions through a synthesis of past experiences and knowledge (W. Wang et al., 2024).

With the era of AI, every aspect of life has been impacted. So are transversal competences, particularly, creative thinking. This study aims to explore the perceptions of students about the impact of AI on their creative thinking development. The significance of this paper manifests at the level of its results. The results of the study are of great use for policymakers, universities as well and students to understand the impact of AI on creative thinking development. The paper provides data that sheds light on the impact of AI on different aspects of creative thinking, namely, originality, ideation, and elaboration. The data provides a solid ground for policymakers, universities, and students to think about effective ways to implement AI in higher education in order to enhance and foster creative thinking.

2. Literature Review

2.1 Transversal Competences

In the field of education, transversal skills are considered part of the holistic development of learners (Yoko, 2015). Transversal competences could be seen as generic skills that have to be developed by students through the several stages of the educational degrees. They rely on a set of natural capacities that must be strengthened, shaped, and combined till reaching the intended ability (Gómez-Gasquet et al., 2017). Transversal competences are not specifically related to the learning of languages or any school subject; they are rather relevant across the spectrum of all subjects in school curricula. These skills are crucial for people to realize their full potential at the level of their educational, personal, and professional lives as well as their role as citizens of an increasingly globalized and unpredictable world (European Council, 2021).

According to Yoko (2015), transversal competences are divided into five categories. The first category is critical and innovative thinking. This category encompasses many key characteristics such as creativity, entrepreneurship, resourcefulness, application skills, reflective thinking, and reasoned decision-making. The second category is interpersonal skills. These skills are related to presentation and communication skills, leadership, organizational skills, teamwork, collaboration, initiative, sociability, and collegiality. Intra-personal skills are another category among the five. As the name implies, it has to do with self-discipline, enthusiasm, perseverance, self-motivation, compassion, integrity, and commitment. Moreover, transversal skills include global citizenship. This domain is concerned with Awareness, tolerance, openness, respect for diversity, intercultural understanding, the ability to resolve conflicts, civic/political participation, conflict resolution, and respect for the environment. The final domain is physical and psychological health. It is basically about a healthy lifestyle, healthy eating, physical fitness, empathy, and self-respect. The UNICEF (2019) divides transversal competences into three groups. First, transversal competences are composed of cognitive Skills. These skills have to do with thinking and include the ability to focus, problem-solve, make informed choices, and set plans and goals. The second component of transversal competences is social Skills. This group is related to interaction with others, particularly the ability to communicate, collaborate, resolve conflicts, and negotiate. The final group of skills is Emotional Skills. This group revolves around understanding and regulating one's own emotions, coping with stress, understanding the emotions of others, and the ability to empathize with others.

2.2 Creative Thinking

Creativity, as defined in the literature, is a combination of ideas bounded to have novel value, or meaning to various stakeholders (Chirico et al., 2018; Csikszentmihalyi, 1996; Guilford, 1950, 1967; Torrance, 1969, 1974, Collard & Looney, 2014; Habib et al., 2024). It is a way through which the world is seen from different perspectives (Fox & Schirrmacher, 2014; Durnali et al., 2023). Creativity is a process that is composed of divergent thinking, whereby ideas are generated, and convergent thinking through which the best ideas are chosen in order to determine creative solutions or choices (Guilford, 1967; Torrance, 1974; Habib et al., 2024).

Creative thinking is composed of four dimensions of skills, particularly "fluency", "originality", "elaboration", and "flexibility" (Torrance, 1969; Durnali et al., 2023). In other words, Creative thinking is a level of fluency, flexibility, and originality of ideas that individuals think of when they are faced with complex problems or contexts (Hee Kim, 2006; Yao et al., 2024). Through creative thinking, an individual visualizes the existing situation in their mind using their imagination. They have control over the problem by putting forward assumptions, and then put forward a different idea or concept by using different or familiar methods (Yıldırım, 2007; Durnali et al., 2023).

2.3 Applications of Artificial Intelligence in Higher Education

Artificial Intelligence has profoundly invaded all walks of life, including higher education (Crawford et al., 2023). Interestingly, this has sparked the attention of stakeholders, educators, and researchers across distinct disciplines (Crawford et al., 2023). Crompton and Burk (2023) state that AI use in HE and research on the issue have extensively increased in the last few years. Within this realm, the applications of AI in higher education are mainly the concern of this section.

Research has already shown that AI has a wide range of applications within the sphere of higher education, one of which is prediction. Ouyang et al. (2022) posit that predicting students' performance is an important attribute of AI in higher education. Within the same line of thought, it is important to mention that AI can be used for prediction in higher education by using multilayer perception artificial neural network models with a "backpropagation algorithm" (Musso et al., 202). That being said, AI makes it possible to predict academic retention or degree/course completion, academic performance, or outcomes based on students' data (Khoudier et al., 2023). With those opportunities, HE educational stakeholders can come up with focused and proactive interventions, leading inevitably to an efficient and personalized learning experience through resource recommendation, individualized assistance, and more. In the same context, Chu et al. (2022) found, in their investigation of the most cited works on AI in HE from 1996 to 2020, that profiling and predicting students' status dominated the literature in that very particular period of time. This study also indicated that AI was mainly an attribute of engineering (courses).

(Automatic) assessment, which has always been a daunting task for educators, is the most recurrently chronicled application of AI in the higher education context. AI is being extensively integrated in higher education to automatically grade students' work, which makes giving immediate feedback possible (González-Calatayud et al., 2021). So doing enhances learning outcomes (Hooda et al., 2022). In the same line of argumentation, Williams (2023) states that AI-powered formative assessment is one of the primary uses of AI in higher education, facilitating and paving the way for continuous assessment and student support. Some AI-powered tools that are harnessed for assessment include, but by not limited to, QuizGeko, Quizgenerator, Quizbot, Conker, and Gradescope. This AI-powered assessment in higher education seems promising. However, there is still a "dark side to it. In this regard, Ivanov (2023) warns that AI in higher education can potentially threaten privacy, ethics, creativity, and critical thinking.

Adaptive systems and personalized learning are also areas where AI in HE has shown great potential. In this vein, Zawacki-Richter et al. (2019), who scrutinized the literature from 2007 to 2018, revealed four uses of AI in education: profiling and prediction, assessment and evaluation, adaptive systems, personalization, and intelligent tutoring systems. For Hinojo-Lucena et al. (2019), AI has been largely utilized to implement virtual tutoring for improved learning. In the same vein, Crompton and Burk (2023), who scrutinized the literature surrounding AI in HE from 2016 to 2022, showed that AI in HE is primarily used for assessment/evaluation, predicting, AI assistants, intelligent tutoring systems, and managing students' learning. The most studied populations are undergraduates (72%), professors (17%), and managers (11%) (Ibid). Briefly put, AI in HE is recurrently associated with prediction, assessment, personalized learning, and intelligent tutoring. These applications of AI in HE would presumably unleash students (transversal) skills, the most important of which is Creative Thinking (CT), which is the concern of the following section.

2.4 *Artificial Intelligence and Creative Thinking in Higher Education*

The role of soft skills or transversal skills is becoming more crucial than ever before. Soft skills, which are an umbrella term, encompass skills such as collaboration, decision-making, emotional intelligence, leadership, and Creative Thinking (CT) (Lāma, 2020). The development of these skills is immensely influenced by several factors, one of which is AI, which has taken higher education by storm Valūnaitė-Oleškevičienė et al., 2019). Within this context, this section sheds light upon the intersections between AI and CT in Higher Education.

AI has taken Higher Education by storm, and this revolution of AI in HE has important implications for students' creative thinking (CT) abilities. Hasibuan and Azizah (2023) assert that AI would potentially enhance creative thinking through the personalization of learning experiences, which improves creativity and innovation among students. In the same vein, Creely and Blannin (2023) state that AI influences creativity in higher education. Yet, the question to be asked here is: how does AI influence creative thinking? This gives robust significance to the present study. Cropley (2020) highlights the critical role of digital literacy in the effective use of AI, which presumably improves transversal skills such as problem-solving, critical thinking, and "embracing uncertainty". Even though AI in higher education can enhance creative thinking in HE, Newton and Newton states that (2021) structured support is of critical significance in augmenting human thinking.

Technology, AI in this case, can improve the following areas of creative thinking:

❖ Finding or noticing the problem;
❖ Exploring, clarifying, and formulating the problem;
❖ Selecting, developing, reviewing, and completing the idea (ideation);
❖ Assisting in overcoming obstacles in all the above-mentioned stages ((Newton and Newton, 2021).

Ryu and Han (2018), who studied the topic in the Korean context, found that AI would help in improving students' creativity. However, while assuming the usefulness of AI and its implications for creative thinking enhancement, understanding the difference between human creativity and computational creativity, ensuring the use of technology to expand human activity,

sufficient infrastructure and teachers' digital literacy are critically important (Newton and Newton, 2021). The existing literature surrounding AI and creative thinking reveals a drastic inconsistency regarding the impact of AI on creative thinking, and there is also a lack of evidence supporting the outlined claims, as this area of research is still in its infancy. Consequently, conducting evidence-based studies is inevitable, especially in the Moroccan context, to better understand the topic under scrutiny.

3. *Methodology*

The present study adopted a qualitative approach to explore students' perspectives on the impact of AI on creative thinking development as the qualitative approach allows researchers to explore the meanings of social phenomena as experienced by individuals themselves (Grossoehme, 2014). This aligns with the main objectives of this study, which were exploratory in essence. Besides, the study chose the qualitative approach for participants not to feel confined to pre-determined responses and to express their opinions and ideas (McKim, 2023).

3.1 Research Questions

The current study aimed to explore students' perceptions of the impact of AI on their creative thinking and investigate the impact of AI on students' creative thinking development. Consequently, it was guided by the following research questions:

1. What impact do AI tools have on students' creative thinking development?
2. How do students perceive the impact of AI on their creative thinking development?
3. To what extent do AI tools contribute to or hinder creative thinking development in higher education?

3.2 Data Collection

The data collection tool used in the study was in-depth interviews, given the qualitative approach of the study. The in-depth interviews were used "to understand the interviewee's perspectives about their experiences" (Zadra, 2014). The interviews were in electronic format and were made up of five open-ended questions, each of which sought to elicit the perception of the interviewees (Creswell & Creswell, 2018) about the impact of AI on their creative thinking. The five questions revolved carefully around creative thinking and AI so as to generate data that can help the researchers to answer the research questions.

3.3 Data Analysis

In order to determine the meaning behind the participants' responses, a thematic analysis was adopted. The data were analyzed following a broad approach of reading and rereading in order to identify themes and subthemes throughout the data. A line-by-line coding was the first step in the data analysis process; the second step was the categorization of the generated codes into themes and subthemes that are intended to answer the research questions.

4. Results and Discussion
4.1 Participants
The study collected data from 17 Ph.D. students from the Department of English, Faculty of Letters and Human Sciences, Dhar El Mahraz, Fez, Morocco. The sampling approach adopted was nonprobability sampling, specifically, convenience sampling. The researchers sought responses from students who were accessible in terms of time and place. 55.6% of the sample were females, while 44.4% were male participants. The age ranges were as follows: 33.3% were between the ages of 20 and 24; 38.9% were between 24 and 30; and 24.8% were above 30.

4.1.1 The Impact of AI on Creative Thinking Development: Ideation, Elaboration, and Originality

It is crucial to mention that the present study investigated the impact of Artificial Intelligence (AI) on Creative Thinking Development (CTD) at levels of ideation, elaboration, and originality.

To start with, the impact of AI on CTD at the ideation level, the thematic analysis revealed two significantly paradoxical themes, namely: AI enhancing CTD and AI promoting dependency on AI. While the former (AI-enhancing CTD) was supported by three immensely pivotal subthemes: diversifying perspectives, generating and organizing ideas, and speeding up the ideation process, the latter was supported by two subthemes: promoting dependency and generating irrelevant information. This was recurrently reported in the interviewees' responses. The second interviewee highlighted the ability of AI tools to improve the ideation stage by stating: "AI is capable of swiftly analyzing enormous volumes of data, providing a variety of perspectives, and combining correlations or patterns that people may overlook". The third interviewee emphasized the role of AI tools in generating and organizing ideas: "AI not only generates ideas but also organizes them in a cohesive paragraph, influencing the ideation process positively". Similarly, the sixteenth interviewee stressed the ability of AI tools to speed up the ideation phase by reporting, "It can improve the ideation process by generating new ideas quickly and making the process of brainstorming faster and easier". On

the other hand, interviewee five warned that AI may promote dependency by stating: "It can also make one too dependent on AI".

Moving on the continuum to the influence of AI on CTD at the phase elaboration, the results of the present study showed that AI boosts CTD at the previously mentioned stage. Thus, AI boosting the elaboration part of CTD has frequently emerged as an important theme during data thematic analysis. This theme was bolstered by six subthemes: attention to detail, offering suggestions (choices), broadening imagination, offering mentorship and guidance, idea expansion, and variety of perspectives. In this vein, the twelfth interviewee illustrated that "AI tools impact creative thinking generally, but it specifically affects the elaboration phase by providing different ways of thinking about a certain idea, developing the brainstormed ideas, and speeding up the process". Besides, the sixteenth interviewee added that "paying close attention to details becomes crucial while elaborating. To assist creators in refining ideas in manageable steps, artificial intelligence (AI) technologies can track finer details, suggest incremental adjustments, and even provide data visualizations to map complex topics". The seventeenth interviewee; however, challenged that by reporting, the potential negative effect of AI on the elaboration aspect in creative thinking, "Well, Elaboration is based on the personal touch of the person which means it is the person's angle that contributes to the elaboration process, however, using AI can switch off this angle if the person is blindly relying on AI".

The literature has highlighted originality as an essential aspect of creative thinking. For this aspect, the present investigation revealed that AI improves originality, which showed up consistently throughout the analysis. This theme was largely supported by four subthemes, which are inspiring novel directions, generating innovative ideas, sparking originality, synthesizing, analyzing, and connecting data. In this concern, the second interviewee stated, "Artificial intelligence (AI) can provide concepts or methods that defy accepted wisdom since it is free of human prejudices and experiences. This objectivity can inspire novel directions by generating innovative ideas that go beyond the bounds of conventional human conceptions". Seamlessly, the fifth interviewee reported, "In this regard, I would say AI can be an incentive to originality if used properly...AI tools can give you background information that will spark originality. Nevertheless, AI may negatively affect originality. In this context, the seventh interviewee asserted, "Sometimes I feel that it kills creativity. Repetitive and similar generated suggestions create a pattern, making everything seem automated and lacking the human touch". This made the interviewees' responses paradoxically feature promises and warnings.

These findings suggest a dual perspective to answering research questions: 1. What impact do AI tools have on creative thinking development in higher education? 2. How do students perceive the impact of AI tools on their creative thinking? 3. To what extent do AI tools enhance or hinder creative thinking development in higher education? The results indicated AI tools can positively and/or negatively influence, in case of over-reliance, creative thinking development. Besides, according to the results of the current investigation, students' views revealed that AI tools can impact CTD negatively or positively. Additionally, the data showed that AI is a double-edged sword; therefore, the nature of the impact is immensely dependent on the way AI tools are used. This makes the user primarily responsible for the nature of the impact.

4.1.2 *AI Tools: Booster or Obstacle for Creative Thinking Development?*

The results showed that students have a dual perspective about the impact of artificial intelligence on creative thinking development, featuring the interviewees in three groups. The first group, hence the first theme that emerged during the thematic analysis (AI tools enhance CTD), stated that AI tools enhance creative thinking development. In this line of thought, the third interviewee believed that "Honestly I think that AI enhances our creative thinking for sure because sometimes our thinking is just limited or sometimes we can't express our thoughts correctly so AI helps us formulate our thoughts and ideas correctly and clearly". Additionally, the fifth interviewee argued, "AI can guide you in the right direction, provide inspiration, and enhance creative thinking by broadening one's knowledge. For me, I use ChatGPT sometimes when I'm stuck, and it helps to reorient me and even lift my attention to issues I may not have noticed before". Moreover, the fourth interviewee asserted, "It enhances creative thinking by providing people with opportunities to handle and see ideas and concepts with different dimensions and perspectives". While this group of interviewees believed that AI tools contribute positively to the development of creative thinking in higher education, other interviewees, in stark contrast, posited that AI tools hinder creative thinking. In this regard, the eleventh interviewee contended, "AI tools limit because it will affect our creative thinking. For example, why would a student brainstorm if they can get all the info in 1 minute?". Seamlessly, the thirteenth interviewee supported the argument by stating, "AI limits creative thinking by providing a veneer of creativity in the form of old or already used ideas as new ones, which is not very creative".

The last group emphasized that it is the user, not the AI. In other words, for this group, the nature of the impact (enhance or hinder) of AI tools on creative thinking development is largely contingent upon the way AI-powered tools are used. In this line of argumentation, the twelfth posited that stated that "I think it can enhance or limit creative thinking for different people, and this will be based on how it is used. If a person uses AI all the time, even for the easiest tasks, I think that it will limit their creative

thinking eventually. But on the other hand, if someone uses it with caution and knows how to use AI and when, it will probably enhance their creative thinking". In the same context, the fourteenth interviewee added, "It can do both of them, enhance it if you use it to brainstorm new ideas, explore new combinations, and hence enrich creative thinking. However, it can teach over-reliance on AI assistance and get the habit of losing deep thinking". This makes the user primarily responsible for the AI tools' positive or negative impact on creative thinking development.

4.2 Discussion

The results of the present study showed that AI could influence creative thinking development at the levels of ideation, elaboration, and originality. First, AI can affect the ideation phase thanks to its power to generate ideas and analyze huge amounts of data, sorting it into patterns and possible options for the issue under consideration. This potentially improves the ideation phase by making it easier and quicker. Second, AI also influences the elaboration stage. It allows further development of the brainstormed ideas carefully, since paying closer attention to details becomes critically significant. Besides, AI offers a variety of perspectives through which the user can scrutinize the available possibilities for solving a particular problem. Last but not least, results indicated that AI boosts originality, which is an important aspect of creative thinking. This is presumably because AI allows coming up with innovative ideas that "defy human wisdom". These findings are perfectly consistent with, hence support, the existing literature surrounding the impact of AI on creative thinking (Lāma, 2020; Hasibuan and Azizah, 2023). However, the findings of the current study revealed that AI can negatively affect creative thinking development, and this hugely contradicts the existing literature. Therefore, this provides evidence of the impact of AI on creative thinking development from the Moroccan Higher Education context, which aligns seamlessly with the global scene, and hence contributes to the knowledge base.

The current study found that AI tools can enhance and/or limit creative thinking development in higher education, depending on the way AI is used. On one hand, AI tools can boost creative thinking development, given that these AI-powered tools provide guidance, mentorship, and help at puzzling moments throughout the entire process of creative thinking. This overlaps with the findings of Creely and Blannin (2023), who investigated the impact of AI and creative thinking development and found AI to positively impact CTD. On the other hand, AI tools can, unfortunately, hinder creative thinking development because, as one interviewee emphasized, they promote dependency and laziness. This violates the findings of the previously mentioned studies, making the present study a valuable contribution to the ongoing endeavors surrounding AI and creative thinking development in higher education, particularly in the Moroccan context.

The impact of AI on creative thinking development is largely contingent on the way AI-powered tools are used; this is one of the invaluably surprising findings of the current study. In other words, AI can unleash creative thinking development in higher education if used appropriately, using AI tools as a starting point, guidance, or mentorship, for instance. In the meantime, AI tools can incrementally hamper creative development if not used properly (misuse). This can be through over-reliance or favoring the AI's touch over the personal touch, which is unique. Consequently, some interviewees stated that it is the user, not the AI, who makes the user responsible for the nature of the impact. For instance, if the user uses the AI wisely, it would certainly enhance their creative thinking, but if the user misuses AI, it would inevitably hinder their creative thinking development.

Back to the third research question: To what extent do AI tools enhance or hinder creative thinking development in higher education? The results indicated that the positive or negative impact of AI tools on creative thinking is intricately linked to the way AI tools are used. Therefore, promoting a culture of digital literacy and providing continuous support are prerequisites to maximizing the positive impact of AI on CTD in Higher Education (Cropley 2020; Newton and Newton, 2021). To integrate AI in Moroccan Higher Education institutions for creative thinking development purposes, the present study proposes a balanced approach to AI integration, where humans responsibly collaborate with AI-powered tools.

5. Conclusion

The current study explored students' perceptions about the impact of AI on creative thinking development in higher education. In doing so, it focused primarily on students at the Department of English, Faculty of Letters and Human Sciences, Dhar El Mahraz, Fez, Morocco, as a case study. This investigation comes as an attempt to engage in the scholarly debate that AI has raised recently. Besides, the role of soft skills is immensely important since these skills allow students to smoothly transition to and excel in the workplace. For this reason, this study explored the intersection between AI and Creative Thinking as a soft skill, which is very much needed.

The present study revealed that AI does impact creative thinking development at the investigated levels, namely ideation, elaboration, and originality. Data showed that AI hugely contributes to the ideation phase, given that AI tools can generate and organize ideas, which are the cornerstone of this stage. This makes ideation easy and quick, hence boosting creative thinking. Additionally, results indicated that AI tools also influence the elaboration part of creative thinking. In so doing, AI tools offer diverse perspectives through which the user can scrutinize the issue under consideration. These tools can track the slightest

detail, which can fundamentally influence the suggested solution. Thus, AI tools inevitably impact the elaboration part. Moreover, the use of AI tools influences the originality aspect of creative thinking, for these tools can offer background information on the issue and suggest novel pathways through which the same problem can be handled distinctly. This makes the findings of the present study in line with the previously identified studies in the existing literature.

Concerning the nature of the impact (negative or positive) of AI on creative thinking development, the findings of this study suggested a dual perspective, making AI tools a booster and an obstacle simultaneously. One group of interviewees stated that AI tools unleash creative thinking by generating ideas, offering diverse perspectives, guidance, and mentorship for problem-solving. Nevertheless, the second group suggested that AI tools hinder creative thinking development by offering already used ideas in new ways, and worse than that, making people over-reliant and uncreative in the case of mis/overuse. The last group, unlike the others, highly emphasized the significant role of the user in determining the nature of the impact. In other words, if AI tools are used properly, these tools would inarguably contribute to the development of creative thinking. On the other hand, AI tools can hamper creative thinking development if misused. This is one of the valuably pivotal contributions of the present study to the existing literature. Therefore, this study highly recommends a balanced approach to AI integration to maximize the positive impact of AI on creative thinking development.

This duality of perspective calls for further investigations into the intersection of AI tools and creative thinking development. In this respect, this study used a qualitative approach, which leaves room for subjectivity, and a convenient sampling technique. Consequently, quantitative and mixed-methodology studies with large sample sizes are encouraged. This investigation into the impact of AI on creative thinking development focused mainly on students at the Department of English. That is why cross-disciplinary studies are a promising area for research, as disciplinary studies would probably yield results from distinct perspectives; such studies pave the way for a holistic understanding of the interconnection between AI and soft skills, particularly creative thinking.

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