

The impact of Generative Artificial Intelligence on Transversal Skills in Commerce and Management Higher Education

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Article Info	Abstract
<p>Keywords: Generative AI, Transversal Skills, Higher Education, Digitalization, Technology-based Learning.</p> <p>JEL Classification: N7, I23, O33, D83</p> <p>Received: 30 April 2026 Accepted: 22 May 2026 Published: 23 June 2026</p>	<p>Technology has undoubtedly revolutionized the current course and future of education. Despite its numerous limitations, it is often used in different fields of education to facilitate the processes of teaching and learning. Indeed, technology-based learning is introduced in various academic institutions to promote understanding and engage students in the emerging active and digitalized society. However, while technology was initially used in education to solve practical problems, Artificial Intelligence emerged as a tool that reproduces human-like intelligence.</p> <p>The issue is that Artificial Intelligence can perform academic tasks such as reasoning, problem-solving, decision-making, etc., which can impede the learning and teaching processes. In that matter, regulating Artificial Intelligence is not an option, for AI is widely spread, easy to use, accessible, and feasible. The former presents a significant challenge for policymakers, educators, and researchers as these tools are becoming more embedded in academia. Therefore, researchers are more concerned about how AI should be implemented rather than investigating the concept itself.</p> <p>This study aims to shed light on the intrinsic relationship between soft skills and Generative AI and suggest ways to address this quandary situation.</p>

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INTRODUCTION

Generative skills are deemed essential criteria in job markets and professional development. Not only can they help individuals communicate effectively, collaborate, and operate efficiently with co-workers, but they also help create, innovate, and find solutions to real-life challenges. In our digitalized era, the development of soft skills in higher education poses a significant challenge as AI has conveniently offered its assistance in “problem-solving”, “critical thinking”, and “creativity”. Unfortunately, some students fall prey to convenience and use AI as a brainstormer. The latter includes Artificial Intelligence (AI) problem-solving, real-life challenges, writing humanized and original content, and critical thinking. Students who find themselves in this particular situation do not necessarily think about the importance of developing these soft skills, nor challenge themselves, but rather focus on the short-term: passing exams and getting good grades. Even with educational institutions using AI detection checkers, students are always looking for ways to bypass those detectors instead of engaging in honest and ethical work.

In our rapidly digitalized and digitized world, generative artificial intelligence (AI) is reshaping Higher education institutions (HEIs) and how they traditionally operate. Beyond their technical capabilities, generative AI tools present transformative opportunities for students to develop their transversal skills, such as critical thinking, problem-solving, and creativity; three core skills heavily demanded in the modern workplace. Indeed, it has become increasingly important to develop students' generative skills in the dynamic, flexible, and modernized workforce and prepare them for real-life challenges. Along with this rise in technology, HEIs are often faced with challenging traditional teaching methods and notions of skill acquisition in order to navigate this sudden technological era. Governments are also redefining learning environments and urging for the adoption of AI within HEIs, with changing pedagogical approaches, integrating AI into curricula, including digital literacy classes as core modules, and trying to foster adaptable, tech-enabled graduates. While the former is deemed revolutionary and necessary to navigate the 4.0 industry, it is also worth mentioning that it is viewed as a direct threat that could impede students' acquisition process.

Again, it is important to emphasize that generative AI offers revolutionary opportunities that could help in the acquisition of generative skills by providing personalized learning, emerging and interactive learning spaces, and challenging students on a daily basis. In point of fact, challenging students to be critical and analytical towards AI tools could encourage their digital fluency. Yet, the emergence of generative AI-powered tools raises a plethora of concerns among academics, educators, and policymakers. It is true that despite its potential, merging generative AI with higher education institutions presents challenges that must be addressed to minimize its potential limitations, especially when AI has the power to hinder creativity, independent research, or reflective and analytical thinking. Moreover, there are risks of widening inequities as access to generative AI tools may vary across HEIs and socio-economic backgrounds and structures, especially in underdeveloped or developing countries.

In the context of Morocco, the 'Ecole Nationale de Commerce et de Gestion (ENCG) Fes, a leading institution forming students for national and international job markets, serves as a case study for our research. The purpose is to explore how Generative AI tools embedded in educational settings shape generative skills such as critical thinking skills, conflict resolution skills, and creativity in interdisciplinary contexts. The findings of the study serve as foundational evidence that could positively contribute to the growing body of research on AI and generative skills in Higher education.

This study aims to shed light on the intrinsic relationship between soft skills and Generative AI and suggest ways to address this quandary situation.

- RQ1 How does the integration of generative AI in educational settings influence the development of students' critical thinking skills?
- RQ2 How do users perceive the reliability and neutrality of generative AI when deployed as a tool for conflict resolution, and what factors contribute to these perceptions?
- RQ3 How can generative AI be integrated into academia to support the development of transversal skills (critical thinking, problem solving, creativity) in interdisciplinary teams?

I. LITERATURE REVIEW

While it is important to define soft skills, previous research and literature have no consensus or agreed-upon definition. Soft skills can be traced back to the late 60s in the US military. The core concept was simple: to distinguish between interpersonal and mechanical or machinery skills. The U.S. Army Continental Army Command (CONARC) regulation on systems engineering (CON Reg 350-100-1, 1968) of training defines soft skills as “job-related skills involving actions affecting primarily people and paper” (Whitmore, 1972, p. II-4). The latter emphasizes how soft skills are not technical or machinery skills, but rather ones that influence human interactions and administrative tasks. We could assume that those skills could be collaboration, problem-solving, critical thinking, etc.

A tentative definition of soft skills was formulated as follows: “Soft skills are important job-related skills which involve little or no interaction with machines (including standardized because the situation or context contains a great deal of uncertainty; that is, we don't know much about the physical and social environments in which the skill occurs, and we don't know much about the consequences of different ways of accomplishing the job function” (Whitmore, 1972, p. II-7) In other words, those job functions about which we know a good deal are hard skills, and those about which we know very little are soft skills. Hence, while hard skills heavily rely on technicalities and fixed knowledge, soft skills rely on adaptability, flexibility, and critical thinking.

Another important emphasis here is on the importance of soft skills in versatile, complex, uncertain real-life challenges where standardized approaches may not work. An example would be hostage situations, in which mediators or negotiators are privileged and use soft skills such as communication, emotional intelligence, critical thinking, etc. Soft skills is a term that is used interchangeably with a plethora of terms, namely, transversal competencies (UNESCO, 2016; OECD 2018, 2023), social/emotional skills (Salovey & Mayer, 1990; Goleman, 1995), transferable/generic/core skills (Smith et al., 1974; SThree, 2024), life/people skills (Glicken, 1974), interpersonal skills, 21st century skills, and others.

The different terminologies and classifications vary in terms of fields, industries, contexts, priorities, and perspectives. As previously mentioned, soft skills are in nature complex, content-dependent, and subjective. In that matter, each discipline rebrands the term as per to emphasize their priority (Cinque, 2016; Matteson et al., 2016; Touloumakos, 2020; Mahon et al., 2024). According to Cinque (2017), soft skills represent a dynamic combination of cognitive and meta-cognitive skills, interpersonal, intellectual, and practical skills. They help people adapt and behave positively to deal effectively with the challenges of their professional and everyday lives. The former further emphasizes the importance of soft skills in real-life challenges and everyday

situations, which displays once more the importance of developing soft skills in higher education to prepare students to face the job market.

Soft skills, transversal skills, and generative AI-related skills are often used interchangeably, although many scholars argue that they are distinct, which is why it is important to understand how they relate and where they diverge. Among the former, soft skills are considered to be the most familiar, and they refer to the personal, interpersonal, and socio-emotional attributes that shape how people manage themselves and how they interact with others. The former was first introduced by Whitmore and Fry (1972), who described them as job-related abilities which can apply broadly across different work settings and involve little direct interaction with machines. Later work on emotional and social competence further reinforced the claim that effective performance is being dependent on more than mere cognitive or technical expertise, thereby extending to self-awareness, self-regulation, motivation, empathy, social skills, communication, team-work, adaptability and conflict resolution (Goleman, 1998; Boyatzis, 2008). In this regard, soft skills can be understood as abilities that regulate behavioural and relational competence.

Transversal skills, on the other hand, broaden the scope, as they are transferable competencies that cut across disciplines, occupations, and social contexts. In other words, while soft skills are part of this broad category, transversal skills expand to include cognitive, digital and civic capacities. For instance, UNESCO's framework identifies the key transversal competences to encompass critical and innovative thinking, interpersonal and intrapersonal skills, global citizenship, and media and information literacy (Care & Luo, 2016; UNESCO Bangkok, 2016). In the same vein, the European Skills, Competences, Qualifications and Occupations (ESCO) framework highlights thinking skills, self-management, social and communication skills, and life skills as core abilities that apply to different occupations and contexts (European Commission, 2022). Therefore, transversal skills can be defined as a wider set of portable capacities that help people adapt as academic, professional, or civic environments change.

Complementing the former, generative skills can be interpreted as an emerging socio-technical subset of competencies, which, unlike the aforementioned, are highly dependent on generative technology. For example, recent scholarly work on generative AI literacy points to a number of competencies such as foundational AI literacy, prompt engineering, output evaluation, ethical and legal awareness, along with AI tools' responsible use (Annapureddy et al., 2025). Yet, it is important to mention that these generative skills do not stand alone, instead, they rely heavily on transversal competencies such as critical thinking, digital literacy, ethical reasoning, and also verification.

In our context, generative skills, transversal skills, transferable skills, or even referred to as 21st-century skills, can be understood as interchangeable, productive, versatile, and core skills that are deemed primordial in the 4.0 workplace industry and critical for employability and lifelong learning in a rapidly evolving global economy (Trilling & Fadel, 2009). Therefore, HEIs foreground the necessity to equip students with those skills for flexible and adaptable integration in an ever-evolving global workplace. While the definite impact of Generative AI on transversal skills remains under-researched, studies suggest that technology integration, including AI, can enhance those skills by providing dynamic learning environments that can simulate workplace environments (Popenici & Kerr, 2017). According to Luckin and Holmes (2016), Generative AI tools can assist students by offering personalized learning, problem-solving, and facilitating the learning process. The former provides an instant and unlimited assistance that can help students tailor the learning process to their needs, address individual gaps in knowledge, and support knowledge retention. Numerous research studies highlight the power of Generative AI tools in higher education contexts, especially with their ability to provide personalized feedback, simulate

real-world problem scenarios, and promote creativity levels (Holmes et al., 2022). Another research by Chan and Hu (2023) further emphasizes AI-powered tools' positive impact on student engagement in business education and applied learning contexts. Yet, the benefits of Generative AI tools do not discount the rising concerns about their ability to hinder critical thinking skills and independent problem-solving (Selwyn, 2022).

AI was defined by Baker and Smith (2019), as “computers that perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving” (p. 10). They go on to explain that AI encompasses a broad range of technologies and methods and simulates human-like intelligence. However, an important question was raised: “Can machines think?” (Turing, 1950, p. 433). He proposed that one should focus on whether machines can exhibit human intelligence. His ideas paved the way for Natural Language Processing (NLP), adaptive learning, and more. As per Voogt and Roblin (2012), universities are not only shifting toward competency-based education but also emphasize the importance of integrating digital tools to foster transversal skills. The latter includes critical thinking, creativity, communication, collaboration, and digital literacy (Minsky, 1968). Notable practitioners in the field of AI defined it as “the science of making machines do things that would require intelligence if done by humans” (Minsky, 1968). This further emphasizes AI's ability to perform human-like tasks and mimic human cognition. The latter presents soft skills such as critical thinking, problem-solving, creativity, and decision-making. Indeed, in our digital world, Generative AI has emerged within higher education and holds a transformative power that could either pave the way to effective transversal skills development or hinder the process.

The growing body of research sheds light on both the opportunities and challenges around the use of Generative AI in Higher education. For instance, Generative AI tools have proven to enhance digital literacy in students' critical evaluation of AI-generated outputs (Hwang et al., 2020), which corroborates the development of soft skills such as critical thinking and problem-solving. Moreover, research by Ouyang & Jiao (2021) highlights how collaborative AI platforms have improved students' communication skills and teamwork. The former tools could also benefit students' creativity as they offer safe digital environments where they can engage and challenge themselves or each other on a daily basis. Conversely, Generative AI platforms have been raising concerns as overreliance and dependency could hinder students' critical thinking skills (Bearman et al., 2023), and their creativity. Rising ethical concerns are also predominant in recent research^{as} generative AI tools are considered a direct threat to academic integrity (Cotton et al., 2023).

Unfortunately, and despite the growing body of research, several gaps in knowledge remain unaddressed. First, most studies focus on the inclusion of generative AI in modern Western countries, where access to AI tools is easier and educational systems are modernized, digitalized, and tech-enabled. Therefore, existing studies have yet to consider underdeveloped and developing countries, where access to technology, digital infrastructure, and digitalized HEIs might be problematic. Second, there is a lack of empirical evidence to support the positioning of generative AI in the development of 21st-century skills in business higher education contexts, especially since the former operates in multilingual and culturally diverse environments. Our current study aims to address those gaps by examining the impact of generative AI on transversal skills at ENCG Fes, one of Morocco's reputable higher education schools specializing in Business and management education.

Taken together, these debates suggest that the relationship between generative AI and skill development cannot be understood as a simple matter of technological use leading directly to better learning outcomes. In our study, generative AI is approached as part of a wider learning

process in which students interact with AI-generated content, evaluate its relevance, negotiate its reliability, revise its suggestions, and decide how far to integrate it into their own work. From this perspective, the development of transversal skills is not attributed to the tool itself, but to the reflective and critical practices that may emerge around its use. The conceptual model guiding this study therefore understands AI use as a mediated process: students first engage with generative AI for activities such as brainstorming, explanation, feedback, writing support, or problem-solving; these interactions may then activate learning practices such as questioning, verification, comparison, revision, and reflection; through these practices, students may come to perceive growth in skills such as creativity, critical thinking, problem-solving, self-regulated learning, and communication. This model also recognizes that such development remains conditioned by factors such as task design, teacher guidance, AI literacy, language proficiency, prior knowledge, and students' awareness of the risks of over-reliance or cognitive offloading.

II. METHODS

2.1 Research Design

Our study's target population comprised 400 undergraduate students' under-enrolment in an EFL course at École Nationale de Commerce et de Gestion de Fès during the spring semester for the 2024/2025 academic year. The participants were selected as generative AI tools, especially language learning tools, translation systems and writing assistants have increasingly become integrated into their daily language learning practices. However, only 165 students completed the online structured questionnaire, thus resulting in a response rate of 41.25%, which accounts for a statistically significant sample size. The respondents' pool comprised a total of 165 students drawn from a single population, with a gender distribution of 60% female and 40% male, and an age range spanning from 20 to 23 years old. Moreover, the entirety of the participants ($N = 165$) indicated being subject to prior engagement with generative AI tools for their educational activities and learning processes. This familiarity provided meaningful insights into the generative AI tools' impact on learning outcomes.

Concerning the subsequent qualitative phase, a subset of ($N = 20$) participants, including 12 females and 8 males, was selected from the questionnaire respondents sample ($N = 165$) using maximum variation purposive sampling (Michael Quinn Patton, 2015). The aforementioned sampling strategy facilitated a selection that represented variation in gender frequency of generative AI use and preferred AI tools and enabled capturing diverse perspectives and experiences related to generative AI use in learning contexts. In line with the former, participants reported engaging with various conversational and generative AI tools, especially ChatGPT, DeepSeek, Gemini and Grammarly and used for a wide range of learning purposes in EFL contexts, such as brainstorming ideas, refining written assignments, receiving feedback on language use and personalized learning experiences.

During the structured interviews, participants ($N = 20$) were asked to describe their experiences with AI tools for learning, but also asked to support it through providing artefacts that illustrate their AI-assisted learning experiences and practices on a daily basis. Furthermore, the provided artefacts helped in serving as prompts during the interviews, encouraging participants to reflect more concretely on how generative AI tools contributed to their overall learning strategies and cognitive processes, whether having a positive or a negative impact. In brief, this approach supports the nuanced understanding of how generative AI tools might affect the development of soft skills, mainly critical thinking, creativity and problem solving in EFL contexts.

2.2 Data Collection Instruments

2.2.1 Phase 1 : *Semi-Structured Questionnaire*

In order to assess the participants' perceptions of generative AI tools and their perceived influence on the development of soft skills, a semi-structured questionnaire was developed grounded in well-established frameworks which relate to three target generative competences, namely critical thinking (Peter A. Facione, 1990), problem-solving (Richard E. Mayer & Wittrock, 2006), and creativity (Teresa M. Amabile, 1996). In this regard, our questionnaire was designed to consist of three main sections; demographics, attitude and frequency, and self-perceptions. The first section was dedicated to demographic data, thus including participants' age, gender and academic level, which was important as our study is designated to assess undergraduate EFL students. The second section focused on exploring participants' attitudes towards the integration of generative AI tools in the context of EFL learning, respondents' temporal patterns of use, their personal perceived usefulness, along with perceived risks and limitations. The third and final section sought to assess respondents' self-perceived development or hindrance of our researched soft skills when it comes to generative AI use on the daily basis for educational processes.

Furthermore, our questionnaire's closed-ended questions were measured using the five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), which is deemed suitable for our research as it is validated for measuring affective constructs, attitudes and self-perceptions (Dörnyei & Taguchi, 2010); it also provides room to capture meaningful variation while still being accessible to EFL learners and the data is captured as robust a robust statistical analysis. Complementing the scaled items, two open-ended questions were included in our questionnaire to allow for more elaboration from respondents regarding their individualized experiences with generative AI tools and further provide background qualitative insights to inform the second phase of our study.

As previously mentioned, the questionnaire was distributed online to a sampling size of 400 students under-enrollment in an EFL course at ENCG during the spring semester, out of which (N = 165) respondents completed the survey, yielding a successful and generalizable response rate of 41.25%, especially considering it was administered shortly before the examination period. Undoubtedly, respondents were informed about the objectives of the study and assured complete anonymity prior to their participation.

The internal consistency and reliability of our questionnaire was assessed through the use of Cronbach's alpha with critical thinking ($\alpha = .82$), problem-solving ($\alpha = .79$), and creativity ($\alpha = .84$), which points to satisfactory reliability coefficients for all scales, along with an overall internal consistency of ($\alpha = .87$). Congruently, content validity was established through thorough review performed by two researchers specializing in linguistics and research methodology, ensuring that the questionnaire was conceptually aligned with the theoretical constructs that are studied and also appropriate for our study's educational context.

What is more, our quantitative data emerging from the closed-ended items of the questionnaire was analyzed through the use of descriptive statistical approaches, while qualitative data emanating from our open-ended questions was examined through the use of initial thematic analysis in order to enable the identification of recurring patterns and probable issues that could be further explored during the qualitative phase of our study. Combining both descriptive statistical techniques and initial thematic analysis was notably driven by the exploratory nature of this study and its mixed-methods design and deemed suitable for the effective depth of our research. In brief, it is worth noting that the use of a semi-structured questionnaire in our first phase served as a foundational

basis for our study and provided an overview of the respondents' perceptions of generative AI tools and enabling the identification of general trends in how these technological tools are put into practice in EFL contexts as well. Yet, the first phase merely captures broad patterns and personal perceptions.

2.2.2 Phase 2: Semi-Structured Interviews with Artefact Elicitation

As to deepen our interpretation of the first phase that includes the questionnaire and its findings, a qualitative phase was also conducted using semi-structured interviews with clear artefact elicitation, which allows the study to expand beyond measuring students' self-perceptions of AI and its impact on the development of their soft skills to thoroughly examine and explore participants' lived experiences with AI tools in EFL learning contexts which are captured from students' authentic narratives, especially for high-order skills such as creativity, problem-solving and critical thinking.

Pre-Interview Artefact Collection

Before conducting the interviews, all selected participants were asked to provide two or three artefacts that illustrate their daily use of AI tools in performing academic tasks and engaging in learning activities. For instance, some students provided artefacts that included personal screenshots of AI interactions across different platforms, mainly ChatGPT, DeepSeek, and Gemini; other students provided examples of AI-assisted written assignments and brief descriptions of their learning activities in which AI tools were used. Furthermore, students were asked to remove any personal information that could compromise the validity of the study or introduce bias, especially when the submission of artefacts is entirely voluntary and confidential.

The artefact elicitation process phase served different purposes; first, it effectively provided concrete data of AI use in authentic learning environments while also allowing the interviews to address specific learning encounters, thus reducing reliance based on retrospective self-reporting and enhancing the richness of our qualitative data and our study overall. In total, we successfully collected a total of 50 artefacts from 20 participants, with an average of 2 to 3 artefacts per participant.

Interview Procedure

In order to ensure the quality of data and respect the convenience of the participants. The interviews were strategically conducted over a period of two weeks, with each semi-structured lasting approximately 40 to 50 minutes and an additional 15 minutes that was allocated for greetings, setup, transitions and brief breaks for the ease of participants. Furthermore, efficiency and data integrity were paramount for our study, which is why a maximum of 3 interviews were conducted per day, thus allowing for sufficient time to review the artefacts that were previously submitted and reflect on emerging themes to discuss.

The interviews were recorded in an audio format, with all participants' informed consent, then transcribed verbatim for analysis and interpretation of results. What is more, interviews were conducted in different languages, mainly French, Arabic, Moroccan Arabic and English, depending on the participants' preferences to facilitate clear communication and ensure the comfort of participants. In that manner, all interviews conducted in a language that is not English were transcribed and translated into English for more consistency during the analytical process stage.

Interview Guide

The interview guide focused on three core soft skills examined in the study: critical thinking, problem-solving, and creativity. Participants were asked to describe how they interacted with AI tools, how they evaluated AI-generated outputs, and how AI influenced their learning strategies. Our interview guide focused on three essential soft skills that are investigated in our study and which emerge in our artefact elicitation, specifically critical thinking, problem solving and creativity. Congruently, participants were asked to describe their interactions with AI tools, their personal and critical evaluation of AI-generated content, and how AI tools influence their learning experiences overall, which will be further detailed in the following table.

Table 1

Interview Guide with Artefact Elicitation

Focus	Sample Questions
✓ AI overall experience	“Can you describe how you use generative AI tools in your English learning activities on a daily basis?”
✓ Critical thinking	“Looking at this prompt/artefact, how did you evaluate AI’s response? Did you directly accept and use it or alter it?”
✓ Problem-solving	“What challenge were you trying to solve here? How did AI help you approach the problem?”
✓ Creativity	“Did AI suggestions influence your ideas or structure? In what way?”
✓ Reflection	“Do you think AI improves or limits your own reflection skills when completing assignments? and how?”

III. Data Analysis

Our study adopted a mixed methods approach to enable the investigation of how generative AI tools hold the power to influence the development of soft skills, notably creativity, problem-solving and critical thinking skills among EFL students enrolled in ECNG Fes. The above will be further elaborated in the following, which were presented in a comprehensive and integrated manner, with qualitative findings curated from our semi-structured questionnaire (N = 165), followed by qualitative findings from our semi-structured interviews alongside the artefact elicitation (N = 20), then supplemented by a unified synthesis of both qualitative and quantitative results. In our following quantitative analysis, mean scores (M) represent the average response on a 5-point Likert scale, while the standard deviation (SD) indicates the variability degree of responses, with smaller values being the reflection of broad alignment and consensus between participants (Field, 2018; Larson-Hall, 2016). All procedures followed institutional ethics guidelines, and each participant received an information sheet and signed a consent form, explicitly acknowledging their right to withdraw at any time without consequence. To protect anonymity, all personal identifiers were removed and replaced with participant codes, and any identifying information within artefacts (e.g., handwritten names) was redacted. Participation was entirely voluntary, with no incentives offered that could imply coercion, and refusal to answer any question did not affect participants’ standing with the researchers or their institution. Artefacts were

collected only with explicit permission for each item; participants retained ownership of their original artefacts, and only anonymized copies or descriptions were used in analysis and reporting, excluding any artefact containing third-party personal data or sensitive content.

IV. Results

4.1 Quantitative Results

Overall Soft Skills Proficiency

The descriptive analysis of our semi-structured questionnaire data revealed varying proficiency levels across our three researched generative skills. As portrayed in our tabulated data below (Table 1), problem solving received the highest mean score ($M = 4.18$, $SD = 0.38$), which indicates that respondents believed they had strongly developed these generative skills, with a small variation in responses and high congruence. Moreover, Creativity scored highly as well ($M = 4.12$, $SD = 0.45$) and suggests that our study sample holds consistent perceptions and rather rate their creativity soft skills as favorable. Yet, critical thinking demonstrated a lower prevalence ($M = 3.50$, $SD = 0.92$) with a larger standard deviation score, thus suggesting a plurality of perspectives in which some respondents considered themselves considerably higher or lower than average in critical thinking skills.

Table 2

Descriptive Statistics of Generative Skills from Semi-structured Questionnaire (N = 165)

Soft Skill	Mean (M)	Standard Deviation (SD)
Creativity	4.12	0.45
Critical Thinking	3.50	0.92
Problem Solving	4.18	0.38

The data results show an optimistic stance toward AI in fostering AI among EFL students. Concerning the qualitative data for questions assessing students' perceptions of the impact of AI on soft skills, descriptive statistics were used to calculate the overall mean, female mean, and male mean. Data analysis values revealed that the overall mean is 4.12, which shows an agreed-upon consensus that AI encourages creativity. The female students' mean (4.15) is slightly higher than the male students' mean (4.08). When it comes to critical thinking skills, the overall mean was 3.5, which portrays that students agree to a certain point that AI can help foster critical thinking, but it can also impede the process if there is an overreliance on AI-powered tools.

The highest overall mean was calculated for problem-solving, with a mean of 4.18. The latter indicates that EFL students may feel overly more confident in using tools such as Grammarly or ChatGPT for surface-based level mistakes, especially in grammar and vocabulary. Figure 1. summarizes the findings on students' self-assessment regarding the impact of Artificial Intelligence tools on their soft skills. The data results show that students have a strong and positive attitude towards the integration of AI in EFL classes, with a limitation for AI to effectively foster critical thinking in students' competencies. In addition to numerical data, qualitative data were retrieved from students' responses to the open-ended questions and were analyzed using thematic analysis.

In that matter, recurrent patterns and terminologies were detected, coded, and grouped into five themes.

Creative writing

Many EFL students noted that AI tools could provide them with novel and original ideas to perfect their writing skills. Others claimed that AI-powered tools can help them paraphrase or rewrite their written tasks in a structured, organized, and grammatically correct way. Quotes: “When I use AI tools, it suggests new phrases and ideas that make my essays stand out in class”, “As I am a young adult EFL learner, I often make grammatical mistakes which AI can resolve in seconds”.

Self-reflected Learning

Numerous participants highlighted that AI personalized feedback helps them reflect on their mistakes and trace their patterns. That way, students can recognize their errors, get feedback, and learn from them. Self-reflection is deemed an important skill in EFL learning

Critical Thinking

Some responses have portrayed that AI was a great tool for fostering Critical thinking if used effectively. Other responses have shown that there are some challenges regarding AI fostering critical thinking. Responses have shown that many have fallen victim to the overuse of AI and have become overly reliant on it. Therefore, it is hard for them to think critically through a situation before running to AI tools for help.

Problem-solving

The data displays that a lot of students feel strongly positive about using AI-powered tools for problem-solving. The latter emanates from the adaptive nature of AI and personalized feedback.

Personalized learning

Several responses emphasized AI's ability to offer personalized feedback, tailored to each student's needs and preferences. The latter creates a sense of an active and responsive environment in which students feel safe to make mistakes without feeling judged.

Recurrence Level Data

The table below (3) presents deeper insight into the recurrence level data, which translates to how frequently respondents engage AI tools with activities pertaining to each skill area; hence, creative writing (25.0%) and problem solving (22.0%) proved to be highly recurrent and aligned with the results of higher mean scores analysed in our descriptive analysis. To this end, our analysis suggests that this consistency portrays how these generative skills are not merely viewed as well-developed ones but also utilized on a daily basis by respondents in their learning activities. On the other hand, Critical thinking skills represented a rather fractional decrease of (18.0%) and personalized learning marginally trailed at (15.0%).

Table 3: *Recurrence Levels by Skill Area*

Skill Area	Recurrence Level (%)
Creative Writing	25.0%
Problem Solving	22.0%
Critical Thinking	18.0%
Personalized Learning	15.0%

Our Data analysis suggests that AI tools could offer many benefits to educational settings. Not only do AI-powered tools appear to be students' allies, but they are also their friends, instructors, facilitators, and personal assistants. Students' attitudes and perceptions toward AI in shaping soft skills are highly positive, as they claim that they constantly learn from it. Conversely, some fear remains that AI can impede soft skills development if overused and relied upon.

4.2 Qualitative Results:

While our initial quantitative findings established possible overarching patterns in the sample's self-perception on the development of soft skills, our study further explored underlying experiences and artefact illustrations through using semi-structured interviews with the purposive subsample of 20 respondents (N = 20), 12 females and 8 males, with degrees of variability regarding the use of generative AI tools for learning and their preferences as well. Pursuant to this, respondents submitted 2 to 3 artefacts before the interview conduction, resulting in a total of 47 artefacts (N = 47) for analysis, namely screenshots of respondents discussions with AI tools for learning contexts (N = 31), examples of AI assisted assignments and practices (N = 9), along with personal descriptions of detailed AI use for learning (N = 7).

Prompted by our gathered data, thematic analysis of our interviews' transcripts and artefact elicitation revealed four major themes that directly relate to respondents' experiences with generative AI tools and their perceived impact on soft skills development; specifically, AI as a catalyst for Idea Generation, cognitive offloading in problem-solving, negotiating trust and verification and the efficiency depth paradox.

Theme 1: AI as a Catalyst for Idea Generation

Our 20 respondents unanimously described using generative AI tools as to generate new ideas, explore differing perspectives and also to overcome certain creative blocks, with descriptions like a " brainstorming partner", " source of inspiration" and an "unlimited proofreading assistant", which helped foster their creative thinking skills, especially for new assignments or longer writings and demanding works.

Overcoming Writer's Block

Twelve participants specifically mentioned using generative AI tools when they feel unable to begin a task:

"Sometimes I sit and I have no ideas. Nothing. But when I ask ChatGPT, 'Give me ideas for this topic,' it gives me five or six directions. Even if I don't use them exactly, they make me think in ways I didn't think before. It's like a springboard." (P07, Female)

"Before AI, I would just sit and wait for inspiration. Now I ask Gemini for ten ideas, and even if nine are bad, that one good idea gets me started." (P02, Female)

Exploring Multiple Perspectives

Nine respondents described using AI tools to generate multiple ways to approach a challenging topic/task, which they then synthesized and modified with their own ideas:

"For my English essay, I asked AI to give me different introductions, I took elements from each and mixed them with my own ideas. The final result was better than anything I could have written on my own." (P12, Male)

"What would someone who disagrees with me say? It helps me see arguments I hadn't considered, especially for argumentation and opinions." (P18, Male)

Creative Combinations and Adaptations

Seven participants talked about using AI-generated content as a raw material which is later adapted and transformed instead of relying solely on the AI-generated output:

"I don't just copy what AI tools give me but I take pieces from different responses and put them together in new ways. It's like collage. The AI provides the materials, but the final work is mine." (P09, Female)

Artefact Evidence: Twenty-three screenshots revealed several ways in which participants prompted AI with open-ended creative requests such as *"Give me 10 creative ideas for learning English sounds faster"* (P07) and *"Suggest three different approaches to analyzing this book in a simple manner"* (P12).

Theme 2: Cognitive Offloading in Problem-Solving

Eighteen respondents revealed that they often used generative AI tools to be able to manage their cognitive load when facing challenging tasks that would require problem-solving efforts, particularly when it comes to unfamiliar materials or situations. This emerging theme encompassed differing perspectives, out of which some supported AI tools' efficiency in challenging scenarios, while others highlighted the awareness students need to be equipped with in the face of potential drawbacks.

Simplifying Complex Material

Thirteen participants reported using AI to simplify difficult materials, especially advanced English ones:

"Sometimes the textbook is very difficult. I put paragraphs into ChatGPT and ask it to explain simply. This saves time." (P19, Male)

Breaking Down Problems

Ten participants explained that using AI tools for breaking down complex tasks into manageable steps was helpful, especially when it comes to structuring their ideas and thoughts, rather than merely providing answers.

"I asked ChatGPT to break down the problem for me, what questions I need to be asking and what factors should I consider and how many. It gave me a framework. I used it to do my own analysis and interpret from my own thoughts." (P09, Female)

Awareness of Cognitive Offloading Risks

Eight participants displayed several concerns pertaining to the potential impact of using generative AI tools, especially in the long term and falling prey to overreliance.

"When I look back, I get that I was asking for simpler explanations for the course, but when the day of the exam came, I couldn't explain those concepts in my own words, my writing ended up poor" (P15, Female)

The artefact elicitation supported these accounts, as provided screenshots of participants' conversations with AI tools for learning purposes display numerous instances of asking to simplify or explain challenging content, including *"Can you explain this paragraph in simple words?" (P19)* and *"Summarise in points" (P04)*

Theme 3: Negotiating Trust and Verification

All our respondents explained that they have gradually developed informed scepticism towards generative AI use, moving from passive acceptance to establishing validation frameworks for critical discernment.

Initial Unquestioning Trust

Seven participants explained how they had a background of directly accepting generated AI outputs, merely without really questioning their validity, relevance or authorship until they encountered certain challenges, most prominently when HEIs are stringent on academic integrity and validation of used sources and real citations.

"I believed everything ChatGPT told me because It sounds so confident and knows everything, but one time I already knew, and it was wrong, and now I don't trust so easily." (P02, Female)

Systematic Verification Strategies

Twelve participants shared how they developed simple verification strategies for AI-generated content, such as cross-checking the information across multiple tools, platforms or browsers.

"AI content is like a first draft. I check everything. If it's facts, I Google them. If it's an interpretation, does this make sense? (P11, Male)

"When AI gives me information, I always ask it where it got the information. Sometimes ChatGPT invents sources." (P01, Female).

Theme 4: The Efficiency-Depth Paradox

A number of sixteen participants highlighted a tension between the timing efficiency offered by generative AI tools and the depth of learning that is achieved, as many described a struggle when it came to deep learning.

The correlation between Speed and Knowledge Retention

When it came to knowledge retention, eleven participants reported that they effectively finished tasks in due time thanks to AI tools, but lacked a deep understanding of the notions after the task was over, which also displays the difference between surface learning and deep learning.

"With AI, I finish my work faster, but I don't remember it as well" (P08, Male)

"I can finish writing in half the time, but if our professor asks in class, I don't remember what I wrote." (P16, Female)

Concerns About Long-Term Development

Seven participants described experiencing concerns and fears about the long-term impact of AI tools on soft skills, which are later demanded in work contexts.

"I always think of how easy it is with AI tools, but I'm afraid it will hinder my soft skills later in my job." (P13, Female)

"Is AI making me smarter in the short term but dumber in the long term?" (P17, Female)

Artefact Evidence: Artefacts illustrated surface-level engagement only, including a 20-page article reduced to bullet points (P04) and a conversation with progressively simpler explanations of complex concepts (P15).

4.3 Synthesis of Qualitative and Quantitative Findings:

Our integrated findings reveal both convergence and divergence between quantitative and qualitative data, with creativity and problem-solving emerging as strengths and high mean scores and recurrence rates corroborated by qualitative accounts of AI as a catalyst for ideation and a scaffold for managing complex tasks. However, Critical thinking provides the lowest mean score and moderate recurrence, with qualitative data revealing supporting this claim, especially when verification requires time and effort that students under pressure often cannot or do not invest in, and the developmental trajectory from blind trust to critical engagement is neither automatic nor universal.

The Efficiency-Depth Paradox, which was only captured through a qualitative lens, exposes the respondent's confusion regarding generative AI tools' efficiency and whether it serves or undermines their long-term learning and development of soft skills. Furthermore, a mention of gender-related variations is deemed necessary, as, while small, they suggest that female respondents may engage in more thorough and systematic verification of AI-generated content. Collectively, these findings indicate that AI's impactful influence on the development of soft skills, namely critical thinking, creativity and problem solving, is highly mediated by certain usage patterns, contextual pressures and students' developing metacognitive awareness factors that must be considered in any pedagogical response, especially in EFL contexts.

V. Discussion

Our study investigates the influence of generative AI tools on the development of creativity, problem-solving and critical thinking skills among the sample size of (N = 165) EFL students enrolled at ENCG Fes, along with the integration of qualitative insights emanating from (N = 20) semi-structured interviews and (N = 47) artefact elicitation and analysis. Our findings reveal that participants regard generative AI tools as predominantly beneficial, especially for creativity and problem-solving, with mean scores of (4.12) and (4.18) and high recurrence rates of 25.0% and 22.0%, respectively.

Participants described generative AI tools as an accessible springboard for ideas, an unpaid brainstorming partner that excels at overcoming writer's block and a real scaffold able to break down complex and challenging problems into more manageable tasks. On that account, findings suggest that generative AI tools hold the capacity to develop and enhance creative and analytical capabilities through the rapid provision of divergent perspectives and manageable or simpler frameworks for learning. However, the findings also point out that participants express concerns about over-reliance, which could negatively impact their own abilities, especially when creativity is often described by some as a muscle that needs constant exercise and practice.

Problem-solving emerged as the most prominent soft skill to intersect with generative AI tools, for students commonly use it to overcome challenging materials and deconstruct complex scenarios or tasks into manageable steps they can navigate more easily. Albeit, our qualitative results reveal a possible growing awareness of the many cognitive offloading risks since participants recognized that the simplification AI tools provide comes at the expense of deep understanding, which is prospectively essential. This dichotomy that joins efficiency and genuine knowledge retention points to the importance of using generative AI tools responsively as complementary to cognitive and intellectual effort.

With the lowest mean score of (3.50) and an (18.0%) recurrence level, critical thinking highlights a significant area of concern, as many participants emphasized how AI tools can be addictive and impede those skills. For instance, our results describe a phase of complete trust and unquestioning when it comes to AI-generated content, towards one which is driven towards more critical engagement and verification that was catalysed by encountering several errors made by generative AI tools. Yet again, data displays how verification processes differ under time pressure and deadlines, which undermines critical thinking skills. The former suggests that even when students possess critical thinking skills and are able to filter AI-generated outputs before using them as raw outputs, learning environments which reward efficiency over depth may prevent students from deploying or successfully developing those skills.

V. Limitations and Future Research Directions

While this study offers contextually grounded insights into students' perceived use of generative AI for transversal skill development, its findings should be interpreted within the boundaries of its methodological design. The focus on one institution should not be viewed simply as a limitation, since it allowed for a coherent and situated examination of AI-assisted learning within a specific EFL commerce and management context; however, it does mean that the findings should be transferred to other institutional, disciplinary, or cultural settings with caution. In addition, the study relied on our self-reported questionnaire and interview data, which may be influenced by social desirability, recall bias, and attribution bias, particularly when students evaluate the role of AI in their own learning processes. The sample also presents certain constraints, including a

response rate of 165 out of 400 students and a qualitative phase based on 20 interviews, which limits the extent to which the findings can represent the full diversity of student experiences. Moreover, because the study did not include pre-/post-tests, control groups, or objective performance-based measures of critical thinking, creativity, or problem-solving, the results should be understood as evidence of perceived associations rather than direct causal effects. Future research could build on these findings through multi-institutional and cross-cultural studies, longitudinal designs, larger and more diverse samples, and objective or performance-based assessments of transversal skills. Further studies may also incorporate digital trace data, classroom observations, intervention-based designs, and teacher or employer perspectives in order to better understand how generative AI supports, reshapes, or potentially constrains transversal skill development in higher education.

Conclusion

Collectively, our findings underscore the necessity for institutional support to train both students and educators to leverage generative AI tools effectively and benefit from the opportunities they present. Professional development programs for educators could train them to understand these technologies and manipulate them for students' benefits, while also equipping educators with the necessary skills to integrate generative AI in ways that enhance student engagement and autonomy while addressing potential ethical concerns. In fact, through fostering a balanced and flexible pedagogical approach that combines generative AI with traditional methods, HEIs could create hybrid, adaptable, and dynamic learning environments that prepare students for the 4.0 workplace while also preserving the development of generative skills and academic integrity. It is thus true that generative AI tools are revolutionizing the acquisition of generative skills in HEIs through their ability to foster critical thinking, creativity, and problem-solving skills thanks to their flexible and versatile nature; however, the concerns arising from generative AI tools need to be addressed and mitigated to ensure the ethical integration of generative AI tools within HEIs and ensure equitable access to digitalized learning opportunities, especially for underdeveloped or developing countries. Our findings also carry relevant pedagogical and policy implications for the integration of generative AI in higher education.

Pedagogically, AI may be approached not merely as a productivity tool, nor as a substitute for students' own reasoning, but as a guided learning resource that can support transversal skill development when students are encouraged to question, verify, compare, revise, and reflect on its outputs. In this regard, teachers could design AI-mediated tasks in which students explain how they used AI, assess the reliability of generated responses, compare them with academic sources, and reflect on how the tool shaped their creativity, critical thinking, and problem-solving processes. At the institutional level, the findings suggest the value of clearer and more balanced AI policies that move beyond both prohibition and unrestricted use.

Higher education institutions could therefore develop AI literacy training for students and teachers, reconsider assessment practices in ways that value process, reflection, and critical engagement, and formulate transparent guidelines on academic integrity, authorship, bias, and data privacy. In this sense, the educational value of generative AI appears to depend less on the mere availability of the technology than on the pedagogical, ethical, and institutional conditions through which it is introduced and critically used.

References

- Amabile, T. M. (2018). *Creativity in context: Update to the social psychology of creativity*. Routledge.
- Annapureddy, R., Fornaroli, A., & Gatica-Perez, D. (2025). Generative AI literacy: Twelve defining competencies. *Digital Government: Research and Practice*, 6(1), Article 13. <https://doi.org/10.1145/3685680>
- Baker, T., & Smith, L. (2019). *Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges*. Nesta.
- Bearman, M., Ryan, J., & Ajjawi, R. (2023). Discourses of artificial intelligence in higher education: A critical literature review. *Higher Education*, 86(2), 369–385. <https://doi.org/10.1007/s10734-022-00937-2>
- Boyatzis, R. E. (2008). Competencies in the 21st century. *Journal of Management Development*, 27(1), 5–12.
- Care, E., & Luo, R. (2016). *Assessment of transversal competencies: Policy and practice in the Asia-Pacific region*. UNESCO Bangkok.
- Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*, 20(1), Article 43. <https://doi.org/10.1186/s41239-023-00411-8>
- Cinque, M. (2016). "Lost in translation": Soft skills development in European countries. *Tuning Journal for Higher Education*, 3(2), 389–427. [https://doi.org/10.18543/tjhe-3\(2\)-2016pp389-427](https://doi.org/10.18543/tjhe-3(2)-2016pp389-427)
- Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 61(2), 228–239. <https://doi.org/10.1080/14703297.2023.2190148>
- Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
- Dörnyei, Z., & Taguchi, T. (2010). *Questionnaires in second language research: Construction, administration, and processing* (2nd ed.). Routledge.
- European Commission. (2022). *Towards a structured and consistent terminology on transversal skills and competences (ESCO)*. Publications Office of the European Union.
- Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction (The Delphi Report)*. The California Academic Press.
- Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. Bantam Books.
- Goleman, D. (1998). *Working with emotional intelligence*. Bantam Books.
- Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., Santos, O. C., Rodrigo, M. T., Cukurova, M., Bittencourt, I. I., & Koedinger, K. R. (2022). Ethics of AI in education: Towards a community-wide framework. *International Journal of Artificial Intelligence in Education*, 32(3), 504–526. <https://doi.org/10.1007/s40593-021-00239-1>
- Hwang, G.-J., Xie, H., Wah, B. W., & Gašević, D. (2020). Vision, challenges, roles and research issues of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 1, Article 100001. <https://doi.org/10.1016/j.caeai.2020.100001>
- Luckin, R., & Holmes, W. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson.

- Mahon, D., Arnab, S., & Jones, A. (2024). Graduate attributes, soft, transferable or transversal skills? Discussing the dynamic intersection of skills development in Higher Education. In A. McNamara, D. Mahon, V. Papageorgiou, & J. Ramdeo (Eds.), *Inspire: Learning for teaching in higher education*. Nova Science Publishers.
- Matteson, M. L., Anderson, L., & Boyden, C. (2016). "Soft skills": A phrase in search of meaning. *portal: Libraries and the Academy*, 16(1), 71–88. <https://doi.org/10.1353/pla.2016.0009>
- Mayer, R. E., & Wittrock, M. C. (2006). Problem solving. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 287–303). Lawrence Erlbaum Associates.
- Minsky, M. (Ed.). (1968). *Semantic information processing*. MIT Press.
- OECD. (2018). *The future of education and skills – Education 2030*. OECD Publishing.
- OECD. (2023). *OECD skills outlook 2023: Skills for a resilient green and digital transition*. OECD Publishing.
- Ouyang, F., & Jiao, P. (2021). Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence*, 2, Article 100020. <https://doi.org/10.1016/j.caeai.2021.100020>
- Oxford English Dictionary. (2005). Interpersonal skills. In *OED Online*. Oxford University Press. Retrieved March 16, 2026.
- Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*, 12(1), Article 22. <https://doi.org/10.1186/s41039-017-0062-8>
- Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality*, 9(3), 185–211.
- Selwyn, N. (2022). The future of AI and education: Some cautionary notes. *European Journal of Education*, 57(4), 620–631. <https://doi.org/10.1111/ejed.12532>
- Smith, A. D., Kawula, W. J., Tippett, G., Curtiss, P., & Depew, J. (1974). Generic skills. *Industrial & Commercial Training*, 6(9), 404–410. <https://doi.org/10.1108/eb003416>
- SThree. (2024). What are transferable skills? In *Glossary*.
- Touloumakos, A. K. (2020). Expanded yet restricted: A mini review of the soft skills literature. *Frontiers in Psychology*, 11, Article 2207. <https://doi.org/10.3389/fpsyg.2020.02207>
- Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. Jossey-Bass.
- Turing, A. M. (1950). Computing machinery and intelligence. *Mind*, 59(236), 433–460.
- U.S. Army Continental Army Command. (1968, February). *Systems engineering of training - course design* (CONARC Regulation 350-100-1). Fort Monroe, VA: Headquarters, U.S. Continental Army Command.
- U.S. Army Continental Army Command. (1973). *Report of CONARC soft skills training conference* (Report No. ADA099612). Defense Technical Information Center.
- UNESCO Bangkok. (2016). *Transversal competencies in education policy and practice: Phase III of the ERI-Net regional research*. UNESCO.
- UNESCO. (2016). *Education 2030: Incheon Declaration and Framework for Action*. UNESCO.

Voogt, J., & Roblin, N. P. (2012). A comparative analysis of international frameworks for 21st century competences: Implications for national curriculum policies. *Journal of Curriculum Studies*, 44(3), 299–321.

Whitmore, P. G. (1972). What are soft skills? In U.S. Army Continental Army Command, *Report of CONARC soft skills training conference* (Report No. ADA099612, pp. II-3–II-20). Defense Technical Information Center.