



Algerian EFL Students' Attitudes towards the Use of Artificial Intelligence Tools for Fostering Self-Regulated Learning

اتجاهات متعلمي اللغة الإنجليزية كلغة أجنبية في الجزائر نحو استخدام أدوات الذكاء الاصطناعي لتعزيز التعلم المنظم ذاتيًا

Dr. Nour El Houda Abdelhai

Department of English, University of Algiers 2, Algeria

nourelhouda.abdelhai@univ-alger2.dz

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ملخص

في الآونة الأخيرة، شهد استخدام الذكاء الاصطناعي في التعليم العالي في الجزائر، رغم كونه لا يزال في مراحله الأولى، تزايدًا ملحوظًا بهدف تعزيز تعلم الطلبة. وغالبًا ما يرتبط نجاح تعلم الطلبة ارتباطًا وثيقًا بقدرتهم على التنظيم الذاتي، الذي يساهم في تمكينهم من أن يصبحوا متعلمين تأمليين ومفكرين نقديين. غير أن الإشكالية المطروحة تكمن في التعقيدات والتحديات المرتبطة باستخدام أدوات الذكاء الاصطناعي لمساعدة الطلبة على تنمية التنظيم الذاتي، خاصة في ظل الاستخدام الواسع لهذه الأدوات ضمن بيئة تعلم يُنشئها الطلبة بأنفسهم، وتهدف هذه الدراسة إلى استكشاف اتجاهات طلبة اللغة الإنجليزية كلغة أجنبية نحو استخدام الذكاء الاصطناعي في تعزيز التنظيم الذاتي، مع التركيز على كيفية إدراكهم لدور هذه الأدوات في دعم تعلمهم على المستويات المعرفية، وما وراء المعرفية، والدافعية. ولتحقيق هذا الهدف، أُجريت دراسة استكشافية اعتمادًا على منهجية تجمع بين الأساليب الكمية والنوعية، بمشاركة 210 طالبًا جزائريًا من طلبة اللغة الإنجليزية كلغة أجنبية المسجلين بقسم اللغة الإنجليزية في جامعة الجزائر 2. ولجمع البيانات، تم استخدام استبيان يتضمن أسئلة مفتوحة وأخرى مغلقة، وُزِعَ على أفراد العينة. وقد أظهرت إجابات المشاركين، التي تم تحليلها كمياً ونوعياً، أن الطلبة يحملون بشكل عام اتجاهات إيجابية نحو استخدام أدوات الذكاء الاصطناعي في دعم التعلم المنظم ذاتيًا، خاصة فيما يتعلق بتحديد أهداف التعلم، وإدارة الوقت، والدعم التعليمي ومع ذلك، ورغم الاتجاهات الإيجابية العامة التي عبّر عنها المشاركون، أبدى بعض الطلبة مخاوف تتعلق بالإفراط في الاعتماد على أدوات الذكاء الاصطناعي، وضعف الانخراط في التفكير النقدي، وعدم كفاية التدريب على

كيفية استخدام الذكاء الاصطناعي بصورة استراتيجية لتعزيز التعلم المعرفي وما وراء المعرفي بشكل أعمق. تؤكد هذه النتائج على ضرورة الإدماج المدروس لأدوات الذكاء الاصطناعي في التعليم، بما يضمن تعزيز التعلم المنظم ذاتيا لدى الطلبة بدلا من إعاقته. كما تقترح بعض التوصيات المتعلقة بدمج الذكاء الاصطناعي في التعليم استجابة لمتطلبات التعلم المستقبلية وتعزيز تعلم الطلبة في الجامعة.

الكلمات الدالة: الذكاء الاصطناعي؛ الاتجاهات؛ طلبة اللغة الإنجليزية كلفة أجنبية؛ التعليم العالي؛ التعلم المنظم ذاتيًا.

Abstract

Recently, the use of Artificial Intelligence in Algerian higher education, though still in its nascent stage, has increasingly gained momentum to enhance student learning. The success of student learning is often closely linked with self-regulation, which contributes to empowering students to become reflective learners and critical thinkers. However, what is at stake is the ultimate twists and turns of AI tools in helping students foster self-regulation, considering that these tools are widely used among students within a self-constructed learning environment. The aim of this paper is to explore EFL students' attitudes towards the use of AI to foster self-regulation, focusing on how these tools are perceived by students to promote their learning cognitively, metacognitively, and motivationally. To this end, an exploratory study based on a mixed-methods design was conducted with 210 Algerian EFL students enrolled in the Department of English at the University of Algiers 2. To collect data, a questionnaire including open- and close-ended questions was administered to the subjects. The subjects' responses, which were analyzed quantitatively and qualitatively, revealed that the students generally held positive attitudes towards the use of AI tools to foster self-regulated learning in terms of setting learning goals, time management, and instructional support. However, despite the generally positive attitudes expressed by the participants, some students reported concerns regarding overreliance on AI tools, reduced critical engagement, and insufficient training on how to use AI strategically to foster deeper cognitive and metacognitive learning. These findings emphasize the need for the thoughtful integration of AI tools into education to ensure they enhance rather than hinder students' self-regulated learning. Some recommendations are suggested regarding the inclusion of AI in education to respond to future learning needs and promote student learning at university.

Keywords: Artificial intelligence; attitudes; EFL students; higher education; self-regulated learning.



Introduction

What does it mean to be a self-regulated learner in the twenty-first century? Has the development of learner self-regulation changed with the advancement of technology in education? Self-regulated learning (SRL) is viewed as a complex process through which students actively engage in their learning by using cognitive, metacognitive, and motivational strategies to achieve good learning outcomes (Pintrich, 2000; Zimmerman, 2000). Considered as a critical determinant of academic success, self-regulation can empower students to become reflective learners, active producers of knowledge, and critical thinkers. However, what it meant to be self-regulated decades ago may be no longer restricted to formal or teacher-led instruction as it once was; it seems that it now extends to the technologies that the twenty-first-century students embrace, use, and engage with.

In this digitalized and fast-paced era marked by the emergence of new technologies, Artificial Intelligence (AI) has witnessed a rapid development in terms of tools, chatbots, and learning platforms, which have been widely accepted and used by students nowadays (Sebbah, 2025). However, what is at stake is the ultimate twists and turns of AI tools in helping students foster self-regulation, considering that these tools are widely used among students within a self-constructed learning environment, with varying degrees of awareness and responsibility. Thus, despite the growing availability and use of AI among Algerian EFL students, little is known about their attitudes towards AI use for fostering self-regulated learning that embodies motivation, cognition, and metacognition. Are students motivated or hesitant when using AI? Do they really trust AI tools for self-regulated learning, or do these tools create new dependencies? This need for investigation seems to be more relevant in a context where AI is still in its nascent stage, especially with the presence of some challenges, such as digital or AI literacy gaps, ethical concerns, and teachers' resistance to AI integration into education (Jeong, 2018). Given these challenges, the present study aims to explore Algerian EFL students' attitudes towards the use of AI for fostering self-regulation. In order to fulfill this objective, three research questions are addressed:

-RQ1: How do students view the impact of using AI on their motivation?



-RQ2: How do Algerian EFL students perceive the use of AI tools for fostering their cognitive learning?

-RQ3: What are the students' attitudes towards the use of AI for metacognitive learning?

This study is significant as it contributes to the limited body of research on the pedagogical implications of AI in the Algerian higher education context, particularly in relation to self-regulated learning. By examining students' attitudes towards AI, this investigation could yield valuable insights for teachers, curriculum designers, and policymakers on how AI tools can be effectively and responsibly integrated into language learning. Moreover, it highlights the need to develop students' AI literacy and self-regulation skills simultaneously, ensuring that AI serves as a supportive learning aid rather than a source of over-reliance. Ultimately, the findings of this study may inform future educational practices and help shape more learner-centered, technology-enhanced environments that foster autonomous and critical learners.

1. Literature Review

1.1 Self-regulated learning defined

Although self-regulated learning is widely recognized as a multidimensional construct, some scholars criticize early cognitive models for overlooking the social and contextual dimensions of learning. Socio-cultural researchers argue that self-regulation does not develop solely through internal cognitive processes but is also shaped by interaction, learning environments, and cultural expectations. This implies that students' ability to self-regulate may vary depending on access to support, digital literacy, and educational context.

Self-regulated learning is a cyclical process that is defined as a complex interplay between cognitive, metacognitive, and motivational dimensions. The cognitive dimension is related to the student's internal procedures of representing and processing information, which include understanding, retaining, and applying knowledge. According to social cognitive theory, self-regulation is bound by three cognitive sub-functions, which consist of self-observation, self-evaluation, and self-reaction (Bandura, 1986). When students demonstrate a degree of self-observation, their self-awareness can increase, paving the way for identifying any potential difficulties that may arise from a given task and for setting achievable goals to approach it effectively. Self-evaluation is



also a crucial component of self-regulation since students are required to assess their progress by drawing analogies between external standards, such as expectations set by the university, peers, and teachers, and internal ones derived from one's self-perceptions and personal goals. The third cognitive sub-function is self-reaction, which is the extent to which students direct their own performance or expectations to have some leverage over their learning process by responding to their behaviors, feelings, and thoughts. As an illustration, when a student works on a challenging task, the anticipation of personal satisfaction, such as deepening their knowledge or achieving a higher score, and positive self-evaluation can push them to sustain their efforts to stay focused and persist despite difficulties.

The metacognitive dimension of self-regulation is about the extent to which students monitor and adjust their learning strategies to approach a task effectively. This is particularly pivotal in the early stages of the learning process when learners need to closely monitor their understanding and performance. The metacognitive strategies include planning, monitoring, and evaluating. While planning helps students set learning goals and suitable learning strategies to approach a specific task adequately, monitoring necessitates students' awareness of the importance of continuous self-controlling, questioning, and analysis of information to make meaning out of a given piece of information. Evaluating requires students to reflect on their performance through self-assessment to identify their strengths and weaknesses (Zimmerman & Campillo, 2003).

Motivation is the third dimension of self-regulation that fuels cognition and metacognition. It is the component that includes the processes that initiate, direct, and sustain one's effort and goal-oriented behaviours (Heckhausen & Heckhausen, 2006). Intrinsic motivation is often perceived as the impetus that pushes students to seek knowledge for personal satisfaction despite the difficulties they may face. On the other hand, students who are extrinsically motivated tend to struggle to stay focused and engaged without external stimuli or rewards. According to Bandura (1986), while both types of motivation are important, students relying heavily on external incentives may have difficulty sustaining long-term commitment and persistence. Moreover, self-efficacy, which is defined as the beliefs in one's abilities to complete a task, is one of the cornerstones of



motivation in self-regulation. Students with a high level of self-efficacy tend to be self-confident and are likely to persist and sustain their learning process even when faced with arduous challenges. However, as noted by Schunk (2012), those “beset with self-doubt are more likely to recoil when the going gets tough” (p. 24). Self-efficacy is also thought to be an influence on one’s emotions. Positive emotions, such as enthusiasm and pride, can boost learning behaviors whereas negative ones, such as anxiety and stress, can generate inhibitory behaviors that hinder the learning process. From the aforementioned discussion of self-regulation in learning, one could conclude that self-regulation is a multidimensional construct that is likely to be influenced by task complexity, the learning context, and the student psychological factors.

1.2 AI and self-regulation: Students’ attitudes

Recently, artificial intelligence has gained wider acclamation in education, for it presents varied pedagogical tools that aim at opening up novel teaching and learning possibilities. Artificial intelligence in education (AIED) is a new emerging field that consists of “the application of AI techniques to mainstream learning approaches and tends to reflect (or automate) existing educational assumptions and practices” (Holmes et al., 2024, p. 42). Thus, the adoption of AI in education is not intended to replace teachers’ skills or undermine learners’ creative thinking; rather, it aims to create new teaching and learning avenues that inspire students to think outside the box and encourage teachers to challenge obsolete pedagogies.

Central to artificial intelligence are different generative tools, chatbots, and learning platforms that are based on interaction mediums and varied pedagogical underpinnings. AI-powered tools and generative chatbots, such as Gemini, ChatGPT, and DeepSeek, can provide self-tailored learning environments that students can adopt to deepen their understanding, synthesis, analysis, and self-assessment. The term “generative” underlies the capability of AI to generate new outputs based on different modes that are triggered by an individual’s queries rather than merely reproducing, replicating, and analyzing received inputs (Dilmegani, 2023). When used ethically and responsibly, generative AI tools can customize students’ learning, paving the way for personalized learning that targets the student’s specific learning needs, styles, and pace.



AI-powered tools can act as “knowledgeable others” in the form of virtual peers with whom students can interact to clarify misunderstandings and receive targeted support. This aligns with scaffolding, a concept advanced by Vygotsky (1978), which occurs within the Zone of Proximal Development to describe the instructional support that students need to progress. In addition to scaffolding, collaborative learning is also emphasized in AI-powered tools since students are given opportunities to engage in reflective discussions with virtual peers or chatbots.

Characterized by immediate and automated feedback, AI-powered tools can assist students in formatively assessing their performance each time they interact with the AI system. This continuous, formative feedback would help them create moments of contingency (Vygotsky, 1978) by identifying students' strengths and weaknesses. By addressing these learning gaps, students can adjust their learning accordingly to answer their learning needs. As an illustration, students can use these intelligent tutors to create quizzes and tasks to assess and apply their understanding to different learning situations. However, researchers warn against the looming impact that AI may have on students' learning outcomes if not used moderately and ethically. In this respect, reducing or replacing face-to-face instructional sessions with virtual learning might detach the learning process from its natural human connection. This also presents a problem when students limit their use of AI to lower-order thinking skills, such as asking it to summarize or generate content, which may lead to AI dependency. Indeed, researchers caution against the positive assumptions that portray generative AI as an inherently transformative educational tool. Some studies suggest that students may use AI superficially for task completion rather than meaningful learning, which could reduce cognitive engagement and weaken independent problem-solving skills. One could argue that without purposeful training or AI literacy, there is a risk of misusing AI, leading to ethical issues, over-reliance, and hindering rather than enhancing student progress

Being AI literate is pivotal in this digitalized era as AI continues to revolutionize all aspects of life, especially learning, teaching, and research in higher education. Understanding how AI works and how to use it to self-regulate one's learning has become an essential skill in today's tech-driven world.



1.3 AI and self-regulation in EFL: Students' attitudes

Understanding how AI works could help students benefit from its ability to regulate their learning. A number of researchers (Holmes et al., 2019; Zawacki-Richter et al., 2019; Chen et al., 2020; Azevedo & Cromley, 2004) have acknowledged the potential benefits of AI tools to foster student learning cognitively, metacognitively, and motivationally. At the cognitive level, AI can be used to customize one's learning by matching the students' cognitive levels through providing incremental explanations and illustrations to support their learning. In this respect, AI tools can control and manage students' cognitive load through dividing the task into short, controllable parts, providing an explicit and strategic answer to ease student understanding, and raising their awareness of how to approach a particular task.

Empirical research supports these claims. For instance, studies on intelligent tutoring systems and adaptive learning environments (e.g. Chen et al., 2020) have shown that learners who interact with AI-supported scaffolding demonstrate improved comprehension and more effective strategy use. Similarly, research by Graesser et al. (2018) indicates that conversational agents and AI-based tutoring systems can enhance learners' understanding by providing immediate, tailored feedback and guiding them through complex tasks step by step. These findings suggest that AI not only supports knowledge acquisition but also facilitates the development of strategic learning behaviors.

When used responsibly, the adaptive content generated by AI can help students self-observe AI responses and notice how the difficult task should be approached, which can lead to internalization of strategies. This way, students can explicitly or implicitly engage in self-evaluation through targeted AI-feedback, AI monitoring systems, and AI benchmark comparisons through comparing their answers to those of AI. When interacting with the AI system, students' self-reaction can be fostered through applying and refining their learning strategies to answer their learning needs and through tracking their progress.

AI tools have also been designed to help students study metacognitively. According to Khotimah et al. (2024), AI tools, when adopted ethically, can enhance students' meta-learning by stimulating their thinking about learning how to learn, and their metacognition by thinking about their own thinking. In this vein, tools, such as Artificial Intelligence-Enabled



Intelligent Assistant (AIIA) and Cognii, can help students plan their learning through setting personalized learning goals as indicated in Khotimah et al.'s (2024) study. This perspective is also reflected in the recent meta-analysis conducted by Wu and Yu (2023). The researchers found that the use of conversational AI, such as Generative Pre-trained Transformers and AI analytics, could foster students' cognitive engagement and self-regulation, including motivation and self-efficacy, and lower their affective filter, leading to a better academic performance. Such tools can encourage reflective thinking by enabling students to self-question, manage their time, and be provided with suitable strategies that help them achieve good learning outcomes. When students are constantly monitored, regardless of the AI tool, they would be able to perform beyond their zone of proximal development. However, when a new technology is introduced without prior training or technological literacy, new technological dependencies and "handicapped learning" are likely to emerge, leading to negative attitudes. For instance, (Kasneci et al., 2023; Firth et al., 2019)

Overall, the literature suggests that AI tools hold considerable potential for fostering self-regulated learning through cognitive, metacognitive, and motivational support. Nevertheless, the existing bulk of research presents inconsistent findings regarding the impact of AI on learner autonomy and critical thinking. Moreover, one could say that limited attention has been devoted to EFL students' attitudes toward the use of generative AI tools for self-regulated learning in higher education contexts, particularly in underexplored contexts such as Algeria. Therefore, the present study seeks to address this gap by investigating Algerian EFL students' attitudes toward the use of AI tools for fostering self-regulated learning.

2. Methodology

The objective of the present study is to explore Algerian EFL students' attitudes towards artificial intelligence for fostering their self-regulated learning. To this end, an exploratory study was conducted to capture the multidimensional nature of the phenomenon under investigation. It is based on a mixed methods design conducted with 210 graduate and undergraduate students from the Department of English at Algiers 2 University. The participants were selected because university EFL learners increasingly interact with AI-powered tools for academic



purposes, making them an adequate population for unveiling attitudes toward AI-supported self-regulated learning.

Mixed methods research combines quantitative and qualitative approaches to provide a more comprehensive understanding of complex educational phenomena (Creswell & Plano Clark, 2018). In the context of the present study, the quantitative component enabled the researcher to identify general patterns in students' attitudes toward AI-assisted self-regulated learning, whereas the qualitative component provided deeper insights into students' experiences, perceptions, and concerns regarding the use of AI tools.

To collect data, an online questionnaire comprising close- and open-ended questions was administered to the participants to elicit quantitative and qualitative data. The questionnaire consists of three scales. The first scale is entitled "AI and student motivation" and has 12 items. The second scale named "AI and cognitive learning" and involves 9 items. The third scale is "AI and metacognitive learning" and contains 8 items. The items are based on a five-point Likert scale ranging from 'never' to 'always', where the participants rate their responses accordingly. Each scale has an open-ended question.

The close-ended items were analyzed quantitatively by using frequency analysis, and the open-ended questions were analyzed qualitatively using thematic analysis. Importantly, to enhance the credibility of the study, the questionnaire items were designed based on the existing literature on artificial intelligence and self-regulated learning. Additionally, combining quantitative and qualitative data contributed to methodological triangulation, which strengthened the validity and interpretive reliability of the findings. The next section presents the results of the present study.

3. Results

The results emerging from the open and close-ended questionnaire are presented in the following sections.



3.1 Demographics

This section presents the results of the demographics that include level of education and use of AI. The results of the participants’ education level are demonstrated in Figure 1:

Figure 1: The participants’ education level

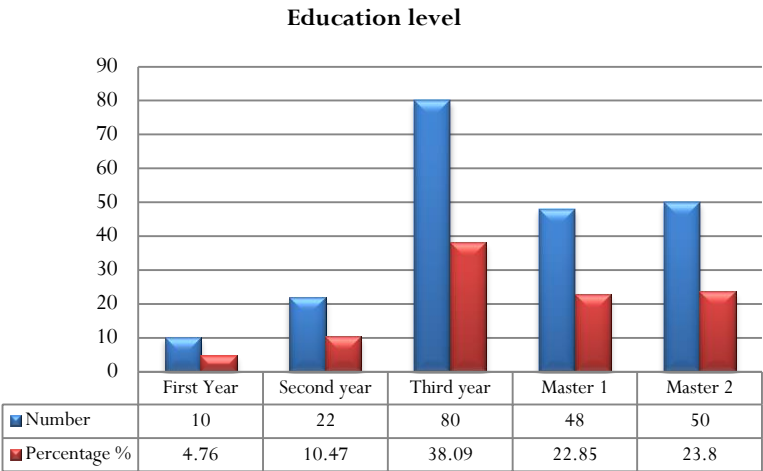


Figure 1 presents the results of the participants’ level of education. The participants are undergraduate and graduate EFL students enrolled in the Department of English at Algiers 2 University. The data reveals that third-year students represent the largest group, accounting for 38.09% of the total participants (80 students). Master 2 and Master 1 students make up 23.8% (50 students) and 22.85% (48 students), respectively. Second-year students constitute 10.47% (22 students), while first-year students form the smallest group at 4.76% (10 students). The results of the students’ use of AI in the learning process are presented in Figure 2:



Figure 2: Students’ use of AI in the learning process

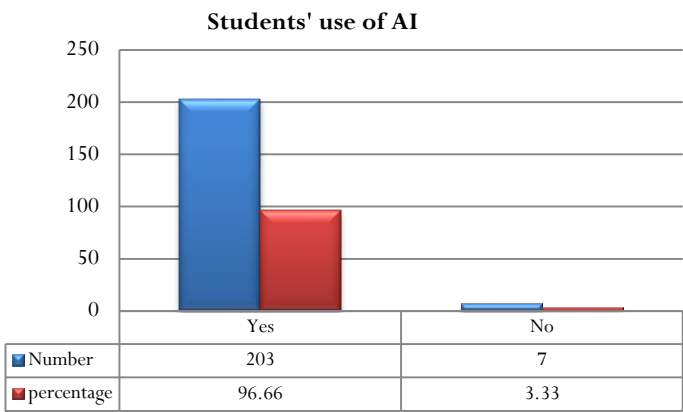


Figure 2 illustrates the results of students’ use of AI in their learning process. The results indicate that the 96.66% of the participants use AI in their learning, while only 3.33% do not use it. These results reveal a growing normalization of AI use among Algerian EFL students, reflecting that AI-powered tools are becoming integrated into students’ everyday academic practices. The overwhelming use of AI among participants also suggests the increasing reliance on digital learning technologies in higher education environments.

3.2 Scale 1: Students’ attitudes towards using AI for enhancing motivation

3.2.1 Results of the close-ended questions:

The results of Scale 1 of the questionnaire are analyzed quantitatively using frequency analysis. These are presented in Table 1:



Table 1: Students' attitudes towards AI for enhancing motivation

N°	Scale 1 items	Never		Occasional ly		Sometimes		Often		Always	
		AF	%	AF	%	AF	%	AF	%	AF	%
1	I am confident that AI tools will help me to master the content I am required to study.	67	31.90 %	24	11.42 %	78	37.14 %	33	15.71 %	8	3.80 %
2	I am confident that using AI will help me get a high score.	26	12.38 %	40	19.04 %	86	40.95 %	48	22.85 %	10	4.76 %
3	I am confident that the use of AI can accurately work out what the task is requiring me to do.	10	4.76 %	40	19.04 %	58	27.61 %	76	36.19 %	26	12.38 %
4	I find it enjoyable when I use AI for learning.	26	12.38 %	18	8.57 %	42	20% %	56	26.66 %	68	32.38 %
5	I get a sense of achievement when I learn new skills or information by using AI.	40	19.04 %	24	11.42 %	54	25.71 %	62	29.52 %	30	14.28 %
6	I use AI tools because I want to do well in my studies so I can show off to my friends and family.	98	46.66 %	28	13.33 %	64	30.47 %	10	4.76 %	10	4.76 %
7	I use AI in education because of other real or perceived expectations of me.	128	60.9 %	19	9.04 %	34	16.19 %	25	11.90 %	4	1.90 %
8	I use AI because I want to get a better score	28	13.33 %	56	26.66 %	34	16.19 %	58	27.61 %	34	16.19 %
9	I get anxious when I use AI tools to do my assignments.	70	33.33 %	26	12.38 %	64	30.47 %	32	15.23 %	18	8.57 %
10	When I use AI tools to study, I start doubting my own skills.	59	28.09 %	24	11.42 %	61	29.04 %	27	12.85 %	39	18.57 %

Table 1 presents the results of students' attitudes towards using AI for enhancing students' motivation. The results reveal that 37.14% of the subjects sometimes believe AI can help them master course content (item 1). Likewise, confidence in AI's role in achieving high scores is moderate,



with 40.95% of subjects sometimes agreeing (item 2). Regarding task interpretation, 36.19% of subjects often believe AI accurately determines task requirements (item 3). With regard to enjoyment, 32.38% of the subjects always find AI learning enjoyable. However, external motivation factors appear less significant, as 60.9% of the participants never use AI due to perceived expectations (item 8), and 46.66% never use AI to impress others (item 7). In addition, some students experience anxiety (30.47% sometimes, 8.57% always; item 11) and self-doubt (29.04% sometimes, 18.57% always; item 12) when relying on AI for studying. The next section presents the results of the open-ended question.

3.2.2 Impact of AI Use on students’ confidence, motivation, and enjoyment in learning

This open-ended question was analyzed qualitatively using thematic analysis. This was achieved by extracting themes and sub-themes from the subjects’ responses. The results related to the first open-ended question of Scale 1 are displayed in Table 2:

Table 2: Impacts of AI on student motivational beliefs

Themes	Subthemes
Positive impacts of AI on student motivational beliefs	Goal setting and persistence
	Increased enjoyment and engagement
	Enhanced confidence
	Extrinsic motivation
Negative impacts of AI on student motivational beliefs	Reduced self-efficacy
	Frustration
	Addiction
	Reduced intrinsic motivation

Table 2 presents the results of the subjects’ responses related to the impacts of AI on student motivational beliefs. This thematic categorization highlights two themes and 8 sub-themes. The first theme, which is entitled “positive impacts of AI on student motivational beliefs”, has four sub-themes. The latter are: goal setting and persistence, increased enjoyment and engagement, and enhanced confidence. Some of the subjects’ responses reflecting the aforementioned results are listed below:



- Subject 15: "It's useful in the sense of making the process of studying less time consuming especially when used not in order to acquire information but to dig deeper and expand my knowledge on the topic. It helps me set many goals and achieve them in a short period of time."
- Subject 71: "AI use, when used properly, doesn't necessarily mean cheating or plagiarism. It helps me adapt the structure of the materials I'm learning from to cater to my mood and preferences on the spot, which makes learning more flexible and enjoyable."
- Subject 103: "AI motivates me to learn and revise basic definitions with no judgment on my level or illogical reasoning. Instead of asking someone else who might bully me, I prefer asking AI. I use it also to get a good score in my exams."

The second theme is named "negative impacts of AI on student motivational beliefs". Four sub-themes emerged from the analysis of the subjects' responses. These sub-themes are as follows: reduced self-efficacy, frustration, addiction, and reduced intrinsic motivation. The subjects believe that the use of AI may create new dependencies and lead to over-reliance. The participants' comments reflecting these results are mentioned below:

- Subject 165: "Although I highly enjoy getting help from AI tools, it makes me less assured about my competence and wonder whether I really deserve the marks I get; not because I cheat but because I start doubting my skills. I feel so helpless as if I cannot do anything on my own."
- Subject 198: "Honestly, I become very lazy to the point that I prefer accomplishing my tasks with zero effort. I think AI reinforces me as a student to not work out my brain and skills, which kills my creativity and pushes me to be lazy."
- Subject 31: "AI affects it negatively in the long run. I might feel really good about learning something so quickly and being confident that I will succeed in the exam, but it lowers my confidence knowing what would happen if it didn't exist, thinking about how scary it is if I got used to it or how dumb I will become if I use it a lot."

The results of Scale 2 of the questionnaire are presented in the subsequent section.



3.3 Scale 2: Students’ attitudes towards AI for cognitive learning

The results of Scale 2 of the questionnaire are demonstrated in Table 3:

Table 3: Students attitudes towards AI for cognitive learning

N°	Scale 2 items	Never		Occasionally		Sometimes		Often		Always	
		AF	%	AF	%	AF	%	AF	%	AF	%
1	I create my own examples of the content generated by AI to make it more meaningful.	15	7.14 %	27	12.8 5%	37	17.6 1%	71	33.8 0%	60	28.5 7%
2	I try and improve my understanding by doing additional work beyond the content generated by AI.	16	7.61 %	18	8.57 %	33	15.7 1%	51	24.2 8%	92	43.8 0%
3	I repeat key concepts and definitions provided by AI to help me remember them.	30	14.2 8%	26	12.3 8%	60	28.5 7%	46	21.9 0%	48	22.8 5%
4	I connect the information from AI responses to my prior knowledge or real-life examples.	14	6.66 %	18	8.57 %	17	8.09 %	63	30%	98	46.6 6%
5	For better understanding, I create summaries, mind maps, or outlines based on AI-generated explanations.	21	10%	10	4.76 %	35	16.6 6%	57	27.1 4%	87	41.4 2%
6	I break down complex AI-generated content into smaller, meaningful parts for better understanding.	20	9.52 %	14	6.66 %	44	20.9 5%	58	27.6 1%	74	35.2 3%
7	I take notes while interacting with AI tools to improve my learning.	23	10.9 5%	22	10.4 7%	51	24.2 8%	50	23.8 0%	64	30.4 4%
8	I create my own examples of the content generated by	15	7.14 %	27	12.8 5%	37	17.6 1%	71	33.8 0%	60	28.5 7%



	AI to make it more meaningful.										
9	I try and improve my understanding by doing additional work beyond the content generated by AI.	16	7.61 %	18	8.57 %	33	15.7 1%	51	24.2 8%	92	43.8 0%
10	I repeat key concepts and definitions provided by AI to help me remember them.	30	14.2 8%	26	12.3 8%	60	28.5 7%	46	21.9 0%	48	22.8 5%

Table 3 presents the results of students’ attitudes towards using AI for cognitive learning. The results indicate that 33.80% of the subjects often generate their own examples to make AI-produced materials meaningful (item 1). In addition, a considerable 43.80% of the subjects perform further work beyond AI content to gain a deeper understanding of the learning material. However, with regards to memory strategies, 28.57% of subjects report that they sometimes repeat key concepts and definitions given by AI. When learning information generated by AI, 46.66% of subjects always relate it to previously learned knowledge or real-life examples (item 4). Students often apply summarization techniques, like mind maps or outlining, with 41.42% stating they always use them to support their learning. Regarding item number 6, 35.23% of students always break down complex AI-generated content into smaller, meaningful parts. Besides, 30.44% of the subjects always take notes while interacting with AI, which is another common strategy that they use to enhance retention. The results of Scale 3 are presented in the next section.

3.4 Scale 3: Students’ attitudes towards using AI for metacognitive learning

The results of Scale 3 of the questionnaire are displayed in Table 4:



Table 4: Students’ attitudes towards AI for metacognitive learning

N°	Scale 3 items	Never		Occasionally		Sometimes		Often		Always	
		AF	%	AF	%	AF	%	AF	%	AF	%
1	I think about the learning strategies that I need to rely on when doing my assignments by AI tools.	41	19.5 2%	33	15.7 1%	76	36.1 9%	32	15.2 3%	28	13.3 3%
2	I spend time trying to evaluate the answers provided by AI to ensure I understand accurately what I need to refine.	22	10.4 7%	15	7.14 %	17	8.09 %	50	23.8 0%	10 6	50.4 7%
3	I self-assess my performance once I finish studying using AI tools.	30	14.2 8%	23	10.9 5%	23	10.9 5%	40	19.0 4%	84	40%
4	I reflect on my learning progress and adjust my performance based on AI feedback.	38	18.0 9%	48	22.8 5%	24	11.4 2%	55	26.1 9%	45	21.4 2%
5	I look over past feedback I have received from AI and check that I have made improvements in my current learning	66	31.4 2%	28	13.3 3%	69	32.8 5%	15	7.14 %	32	15.3 2
6	I think about how I might improve my work by evaluating it against the feedback provided by AI.	48	22.8 5%	33	15.7 1%	67	31.9 0%	38	18.0 9%	24	11.4 2%
7	I verify AI-generated content with reliable sources before	35	16.6 6%	14	6.66 %	31	14.7 6%	41	19.5 2%	89	42.3 8%



	using it in my studies.										
8	I think about the learning strategies that I need to rely on when doing my assignments by AI tools.	41	19.5 2%	33	15.7 1%	76	36.1 9%	32	15.2 3%	28	13.3 3%
9	I spend time trying to evaluate the answers provided by AI to ensure I understand accurately what I need to refine.	22	10.4 7%	15	7.14 %	17	8.09 %	50	23.8 0%	10 6	50.4 7%
10	I self-assess my performance once I finish studying using AI tools.	30	14.2 8%	23	10.9 5%	23	10.9 5%	40	19.0 4%	84	40%

Table 4 demonstrates the results regarding students' attitudes towards using AI for metacognitive learning. The results reveal that the most common practice is evaluating AI-generated answers, with 50.47% of students always ensuring they understand and refine the information provided by AI. 40% of the subjects always review their performance after studying with AI. Regarding item number 4, 26.19% of the subjects often adjust their performance according to the feedback provided by AI. When it comes to reviewing previous AI feedback, the participants' responses are more varied—while 32.85% sometimes check past feedback for improvements, a comparable 31.42% never engage in this learning habit. Students also demonstrate critical thinking by verifying AI-generated content, with 42.38% always cross-checking information before using it in their studies.

3.5 Open-ended question: students' strategies for using AI tools in the learning process

The thematic analysis of the open-ended question results revealed two themes and six sub-themes regarding students' use of AI for deepening their understanding. The results are presented in Table 5:



Table 5: AI for cognitive learning

Themes	Sub-themes
Strategic use of AI	Summarization and simplification
	Interactive engagement
	Critical evaluation
Using AI for active learning	Generating tasks
	Knowledge application
	Organizing learning materials

Table 5 demonstrates the results of the second open-ended question regarding students’ attitudes towards using AI for cognitive learning. The first emerging theme is entitled “strategic use of AI”. The subjects report that they use AI strategically through engaging in relevant and purposeful learning. This is achieved by summarizing and simplifying the difficult lessons, engaging with the AI system through reflective interaction, and critically evaluating the AI-generated content for deeper understanding. The subjects’ comments that match the aforementioned sub-themes are stated below:

- Subject 125: “I usually upload the lessons provided by the teacher into the AI and then get a summary of the lessons.”
- Subject 201: “I use AI to help me summarize my long-detailed lessons and use it to give me a simplified explanation of the lessons.”
- Subject 187: “I sometimes choose the option of listening to the generated responses and take notes while listening. It feels like a teacher is explaining.”
- Subject 25: “AI can be misleading sometimes, that is why I always ask it for references in addition to making a small research on my own from different sources.”

The second theme is entitled “using AI for active learning”. Three sub-themes emerged as indicated in the table above. The subjects hold the view that generating quizzes or exercises by AI can help them reinforce their understanding of the learning material. They also emphasize the fact that they relate the content generated by AI to real scenarios and examples through paraphrasing AI explanations in their own words. In addition, the subjects engage actively with the AI system through taking



notes, mind-mapping, or outlining to retain information. The following subjects' responses illustrate the previously mentioned findings:

- Subject 11: "First, I tell the AI to understand the course and the meaning and depth of it, then I ask for multiple exercises (MCQ, yes/no questions, open-ended questions, essays...). I use it for multiple tasks like explaining concepts, generating exam questions, and even correcting my work and providing feedback and enhancement."
- Subject 203: "When I provide AI with a lesson to explain, I rephrase it in my own words to ensure a better understanding. I also try to apply the examples to my daily life or studies to make the concept more tangible."
- Subject 163: "I use AI to create mind maps, outlines, and abstracts. Once the gist of the matter is processed and grasped, I branch out and get more specific."

The results of the present study are discussed in the subsequent section.

4. Discussion

The present study attempted to explore Algerian EFL students' attitudes towards using AI for fostering self-regulated learning. To this end, three research questions were advanced. The first research question aimed at finding out the students' attitudes towards AI for enhancing student motivation. A noticeable trend emerging from the findings is the dual nature of students' attitudes toward AI-assisted motivation. While many participants perceived AI as a supportive and confidence-enhancing learning companion, others simultaneously expressed concerns regarding dependency, reduced self-efficacy, and passive learning habits. This tension suggests that students do not perceive AI as entirely beneficial or harmful; rather, their attitudes appear to depend largely on how AI is used and the extent to which learners maintain autonomy during the learning process. On the positive side, the students held the view that AI could support goal setting, persistence, and engagement by making learning adaptable to their learning preferences and learning needs. They claimed that AI could help them get instant access to information, which could increase their engagement with the learning material. Serving as a non-judgmental tool, the use of AI was embraced by the subjects because, as indicated in the analysis of the questionnaire



results, it could boost their self-confidence, especially for the students who may feel socially anxious or hesitant when interacting with or seeking help from peers or teachers. These AI positive aspects seem to reflect the premises of self-efficacy and intrinsic motivation since AI could propel students to have some leverage over their learning and sustain their efforts despite the encountered difficulties (Bandura, 1986). However, on the negative side, some of the subjects expressed negative attitudes towards the impact of AI on their motivation. The results of the quantitative and qualitative analysis of the questionnaire indicated that AI may create new dependencies, making students lazy and doubt their own abilities. The findings also showed that over-reliance on AI may create a sense of helplessness and addiction, reduce self-efficacy, and weaken intrinsic motivation if used in a misguided manner. Thus, one could conclude that while AI can be a useful tool for boosting student motivation, its utility depends on the extent to which students are AI literate.

The second research question sought to explore the students' attitudes towards using AI for cognitive learning as part of self-regulation. The participants viewed AI as a useful tool for cognitive learning, particularly in structuring and processing information. The majority of the subjects seemed to be actively engaged with AI by interacting with the system to create examples, summarize long lessons, and break down tasks into controllable parts to enhance understanding, as was shown in the questionnaire results. Some students also reported that they did not study superficially when using AI, but they attempted to study thoroughly by linking AI content to their prior knowledge, cross-checking information, and applying what they learned to other practical examples. These strategies seem to align with the sub-dimensions of cognitive learning, such as self-observation and self-evaluation, as the findings suggest that the students were cognitively engaged in continuous monitoring and evaluation when using AI, which is an indicator of active learning. Despite the positive attitudes generated by the students, some negative ones emerged. The findings of the present study indicated that the effectiveness of AI use is dependent on students' willingness to go beyond passive learning. For instance, a recurring trend emerging from the findings showed that some students were cognitively disengaged when using AI, absorbing the content generated by AI without having self-reaction in order to be able to assess their learning outcomes or adjust



strategies accordingly to address any learning gaps. In this case, when lacking the necessary technological skills to work with AI, the system can be seen as a tool that promotes passive learning, leading students to be consumers of AI rather than autonomous critical thinkers (Firth et al., 2019).

With respect to the third research question revolving around students' attitudes towards using AI for metacognitive learning, the findings revealed that the subjects generally expressed positive attitudes. As was reflected in the questionnaire results, the majority of the subjects viewed AI tools as a toolkit that can facilitate their learning process by enabling them to reflect on their learning outcomes, self-assess their progress after studying with AI, and refine their understanding. The finding of this study falls within the framework put forward by Zimmerman and Campillo (2003) who stressed the importance of planning, monitoring, and evaluating as crucial aspects of successful metacognitive learning. Thus, AI tools are perceived as scaffolding tools that could help students think about their own learning and perform beyond their zone of proximal development, which can result in enhanced deep learning, and better application of higher-order thinking skills (Holmes et al., 2024).

The thematic analysis of the open-ended question further supports this finding, as the participants highlighted the utility of AI in developing their awareness of their thinking processes as they learn. However, it is worth mentioning that some students highlighted the fact that they may develop wrong learning habits if AI is used unethically, superficially, or excessively, leading to weakened critical thinking and decreased creativity. Therefore, as noted by Khotimah et al. (2024), adequate training and AI literacy ought to be provided to students in order to benefit from the advantages of AI and raise their awareness of its responsible use. While AI presents valuable opportunities for personalized and self-regulated learning, it must be integrated responsibly to maximize its pedagogical benefits while minimizing dependency and ethical concerns.

Overall, the findings of the present study reveal several important trends regarding Algerian EFL students' attitudes toward AI-assisted self-regulated learning. First, AI use appears to be widely normalized among students, particularly for cognitive and motivational support. Second, students generally perceive AI as a flexible, accessible, and non-judgmental learning assistant that facilitates understanding, engagement,



and independent learning. However, the findings also exhibit a recurring tension between perceiving AI as an empowering educational tool and fearing its potential to encourage dependency, reduced critical thinking, and passive learning behaviors. This suggests that the educational value of AI does not solely depend on the technology itself, but also on students' AI literacy, critical awareness, and ability to regulate their learning responsibly.

In a nutshell, being AI literate is pivotal in this digitalized era as AI continues to revolutionize all aspects of life, especially learning, teaching, and research in higher education. Understanding how AI works and how to use it to self-regulate one's learning has become an essential skill in today's tech-driven world.

Conclusion

This study set out to explore Algerian EFL students' attitudes towards the use of AI tools for fostering self-regulated learning across motivational, cognitive, and metacognitive dimensions. Overall, the findings reveal that AI has become an integral part of students' learning practices, with nearly all participants reporting its use. The results demonstrate that students hold generally positive yet nuanced attitudes towards AI, recognizing its potential to enhance their learning while also expressing concerns about its possible drawbacks.

At the motivational level, AI was perceived as a supportive and non-judgmental tool that promotes engagement, goal setting, and persistence. These affordances align with key principles of self-efficacy and intrinsic motivation, as students feel more confident and in control of their learning. However, the findings also indicate that excessive reliance on AI may lead to reduced self-efficacy, increased anxiety, and a sense of dependency, suggesting that motivation can be both enhanced and undermined depending on how AI is used.

From a cognitive perspective, the results show that many students actively engage with AI tools by summarizing content, generating examples, organizing information, and connecting new knowledge to prior understanding. These practices reflect meaningful cognitive engagement and indicate that AI can support deeper learning when used strategically. Nevertheless, the study also highlights that some learners adopt passive approaches, relying on AI-generated content without



critical processing, which may hinder the development of independent thinking skills.

Regarding metacognitive learning, the findings suggest that AI tools can serve as effective scaffolding mechanisms that support planning, monitoring, and self-evaluation. Students reported using AI to reflect on their learning, assess their performance, and refine their strategies. However, inconsistent engagement with metacognitive practices and concerns about superficial use indicate that these benefits are not uniformly experienced by all learners.

Taken together, these findings underscore that the effectiveness of AI in fostering self-regulated learning is not inherent in the technology itself but depends largely on students' level of AI literacy and their ability to use these tools critically and strategically. While AI offers valuable opportunities for personalized and autonomous learning, its misuse may result in dependency, reduced critical thinking, and "handicapped learning." Therefore, this study highlights the need for a thoughtful and pedagogically guided integration of AI in higher education. Equipping students with AI literacy skills, fostering critical awareness, and promoting ethical use are essential to ensure that AI enhances rather than undermines self-regulated learning.

Despite the valuable insights generated by the present study, some limitations should be acknowledged. First, the study was conducted with EFL students from Algiers 2 University only, which may limit the generalizability of the findings to other educational contexts. Second, the study relied on self-reported questionnaire data that reflect students' perceptions rather than their actual learning behaviors. In addition, the exploratory nature of the study captured students' attitudes toward AI at a particular moment in time, although these attitudes may evolve as AI technologies continue to develop and become more integrated into higher education. Therefore, future lines of research could involve larger samples and adopt methodological triangulation by combining quantitative and qualitative tools to provide a more comprehensive understanding of AI-assisted self-regulated learning and the instructional interventions that help students develop effective AI-supported learning strategies, particularly within EFL contexts.



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