



Learner Autonomy and Cognitive Processes beneath the Surface of AI Use: The Case of Algerian EFL Master's Students

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Abstract

Learner autonomy has become a fundamental aspect of academic achievement and cultivated cornerstone of ongoing self-development. In doing so, AI presence shapes today's world that is highly characterized by technological advancements. To this end, the interplay between learners' self-directed learning and mediated assisted AI platforms has amplified new paradigms in strategic learning approaches. This study's significance lies in exploring the position of AI in the higher educational system based on tailored participants' feedback. It also seeks to investigate the impact of AI usage on learners' autonomy. To reach these objectives, data were collected from a purposive sample of twelve Master students of English at the university centre of Maghnia grounded in utilizing a semi-structured interview. The findings revealed that there exists a binary correlation between using AI as a medium of comprehension and input processing along with considering over reliance on it as an obstruction against learners' cognitive and linguistic betterment. The paper also brings about pedagogical, psycholinguistic and managerial implications.

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1. Introduction

In recent years the concept of learner autonomy has gained attention in the context of education. It is commonly regarded as a central component of effective learning environments. Traditionally, autonomous learners are referred to those “*motivated ones*” (Ushioda, 1996, p.2). Though, the integration of technology in academic settings has increased multi-dimensional strategies and resources that encourage self-regulation and independent decision making while earlier research emphasize learning autonomy as a central concept in the field of FL learning (Borg & Al-Busaidi, 2012, p. 07). More recent investigations have intensified interest in diversified learning experiences especially at the tertiary level since learning autonomy has been associated with success and tangible achievements “*it becomes part of the pedagogical objectives of a language course*” (Hafner & Miller 2011, p. 69). Furthermore, there is a need to consider the growing adoption of AI in education (Chen et al, 2020) which reflects current trends of contemporary AI based learning systems. It basically highlights several notions such as: excess, personalization and efficiency. However,

existing research has not yet fully addressed the relationship between learner autonomy and the adoption of AI technology at the Algerian university level despite the empirical attention that has been paid to it. Since the implementation of AI technologies in the EFL context is in its early stages (AlTwijri, & Alghizzi, 2024), voicing users’ experiences with AI tools and autonomy qualitatively is therefore critical so as to gain the needed insights for a significant feedback. The present study focuses on EFL Master’s students’ perceptions towards the position of AI in today's e-enabled world. The objectives of this research work are three-fold:

- 1) To explore first-year Master students at the University Center of Maghnia use and perceptions of AI in supporting their academic learning and research abilities.
- 2) To examine the perceived benefits and challenges from linguistic, educational and psycholinguistic perspectives.
- 3) To investigate whether the application of AI tools influences their autonomy and self-directed learning.

Ultimately, the study looks at AI technologies trajectories and divergences

and how self-reliance is framed according to the research sample selected.

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2. Literature Review

Learner autonomy is commonly defined as *“the capacity to have control over one’s learning”* (Benson, 2011, p.02). Emphasizing the motivation to plan, orient, evaluate and construct a successful learning evolution. Along this thought, (Holec,1981,p.09) advocates that *“the learner is concerned with fixing objectives, defining the contents and progressions, selecting the methods and techniques to be used, monitoring the acquisition procedures and evaluating what has been acquired”*. By doing so, learner autonomy symbolizes a capability of decision making that promotes strategic awareness of the educational contexts and the extent to which individuals are able *“to take charge of one’s own learning”*. (Benson,2011, p.10)

A substantial body of literature suggests that the concept of autonomy similarly

implies that the learner enjoys a high degree of freedom. (Little, 1991,p.10). The literature highlights a widely recognized consensus in regards to the learners’ role in shaping their educational realities which can be consequently improved or constrained. According to (Littlewood,1996), learners are able to make choices in relation to their learning architectural monitoring. Becoming lifelong recipient of knowledge is far away from any external formal environment. To this end, learners can effectively lead their success journey merely turning to their *“self-teacher”*. Apart from these notes, creating a balanced atmosphere where self-reliance flourishing requires support from teachers’ belief since *“understanding students’ learning styles and maintaining teacher-student relationship”* (Nguyen, 2012) help students by designing, providing tools, strategies and constructive feedback regularly. Considering teacher’s role towards fostering autonomy mindset, (Reinders, & Balcikanli, 2011) stress out the crucial role that teachers can take in order to spread the sense of independent scholastic attainment among learners. In university contexts, there is a shift from *“ready-made”* knowledge to knowledge acquisition by the learner on his own. (Raitskaya, 2021). This highly indicates

certain independence proactively managed via different sources. It is likely a complex self-regulation that necessitates intellectual rigor, analysis and scaffolding. From another angle, being able to shift towards “self-management” is a result of heightened grasp of the demanding requirements at the university level. Additionally, the learner is no more the process; he is simply the product of his own version, capable of pursuing future endeavors.

Artificial intelligence has increasingly expanded as a preliminary role in the current educational sphere. According to (Hwang et al, 2020.p02) “an AI application might play the role of a tutor who observes students learning processes, analyses their learning performance and provides instant assistance to them based on their needs.” There is merely a link between serving as a catalyst for skills improvements and digitally based system which reshapes those old basic roles of instruction provision. Despite the so-called promising features of AI integration, it remains challenging (Ouyang et al, 2022). Moreover, (Banihashem et al, 2025.p.02) acknowledge: “intelligence implies a machine’s capacity to replicate cognitive processes like learning, reasoning and problem -solving which are typically

associated with human intelligence”. There is an ongoing debate which triggers a reconsideration of AI in education from a purely cognitive standpoint. To say it differently, the sophisticated AI infrastructure is likely categorized not only algorithmically but also sustainably. Therefore, the exploration of learning is diminished by the over-dependency on IA as pragmatic restrictions are to be framed.

For instance, (Yu, 2024) adds “as we embrace the prospects and address the challenges introduced by AI, an unwavering dedication to ethical stewardship, transparency and accountability will be paramount”. The topic of AI discusses risks and shortcomings that may elusively hinder the beneficial learning attainments. It starts raising questions about ethical conduct especially among university students which may fail to develop content validity checking attributes. Scholarly attention can adequately serve as thought-provoking areas of inquiry and educational implications as far as learning autonomy dimensions are concerned. (Almohesh, 2024,p.13) suggests that “collaboration among educators, technologists and researchers is paramount for designing and implementing AI powered applications

that align with the principles of learning autonomy". Nevertheless, "AI integration should not only provide technological support but also foster students' self-regulation capacities, contributing to the design of educational environments that encourage autonomous learning". (He, 2025)

3. Methodology

3.1 Research Questions

3.3 Data Analysis

Data gathered were analyzed based on - Thematic Analysis- by Braun and Clarke (2006). It includes 6 main steps which are: familiarizing with the data, obtaining initial codes, identifying themes, evaluating, defining and reporting the final themes.

3.4 Main Findings

a- Students' Use and Perceptions towards AI Tools as a Support to their Academic Learning

Phase One: Familiarization with the Data

The initial review of data gathered indicates that students perceive the use of AI within the learning process as familiar, easily accessible and beneficial. Many participants described the incorporation of artificial

RQ1: How do students use and perceive AI tools in supporting their academic learning?

RQ2: How does the use of AI tools influence learners' autonomy?

3.2 Data Collection/ Participants and Setting

In order to collect data, a semi structured interview was used with 12 Master One students at the university centre of Maghnia.

intelligence especially in the field of higher educational system as unavoidable. As one student mentioned: "*I use AI since 2023 since my second year of university, it was a new thing among students themselves; it helped me so much in my academic and personal life*". Despite its utility and multifaceted usages, all students except one admitted that it encompasses several limitations and pitfalls. A participant acknowledged that "*the most common challenge is when relying on AI too much, it weakens my thinking skills, making it harder for me to create ideas*." This highly indicates awareness towards the utilization of AI in education and notably its impact on his cognitive outsourcing development efficiency.

Phase 2: Generating Initial Codes

Based on interview data, anticipatory codes could be systematically generated which mirror AI use and perceptions according to students' experiences.

- a) **Familiarity & Frequency:** indicating learners' ability to know and understand AI tools and systems in addition to the regularity of the use.
- b) **Clarification of the contents:** indicates the extent to which learners are able to be provided with the needed explanation to ensure understandable information gathering.
- c) **Exams/ Assignment Support:** indicates that AI powered tools help students organize and prepare for exams thanks to instant sources, tailored tasks and feedback.
- d) **Efficiency/ Flexibility:** indicates that the use of AI allows students to complete tasks quickly rather than manually. It optimizes personalized access anywhere and anytime.
- e) **Personalized Explanation:** indicates and individualistic adaptability to the learning experiences, needs, styles and

preferences which makes it more engagement and dynamic.

Phase 3: Searching for Themes

Themes	Categories	Examples from Data
Comprehension and Meaning Construction	Concepts Clarification	"Chat GPT Simplifies daily tasks allowing searching for new information".
	Exams Preparation Support	"I use chat GPT Gemini and Gizmo and others tools to help me and my homework and when searching for new information to revise for exams".
AI & Cognitive Scaffolding	Guided Problem Solving	"It helps me summarize long PDFs reducing Stress and anxiety about studies".
	Personalized Learning	"AI enhances learning by providing instance answers and personalized recommendations and interactive tools".
Flexible Language Mediated Learning	Accessibility & Efficiency	"AI is easy and accessible to everyone it is also cheap and rapid in use."
	Flexibility	"AI saves time helps me with research improves writing and provides personalized experiences."

Table 1: Students' Use and Perceptions towards AI tools

Phase 4 5 and 6 reviewing, defining and reporting themes: These steps are well indicated below:

a- Comprehension and Meaning Construction

Among the major uses of AI by students is foregrounded on the need to simplify information by offering explanation and follow-up lectures' notes. From a similar perspective, AI support means minimize cognitive load as they function through assisted evaluation and abstract contents clarification. Among the interviewed learners, one of them clarifies: "*I mostly use it to understand interesting knowledge and facts especially vocabulary explanations for lectures I didn't understand or attend.*" The growing inclusion of artificial intelligence at the tertiary level often indicates a gradual shift to seeking assistance from software or programs that are able to perform human-like intellectual rigor. According to some students, AI is a consolidation tool that serves as a tutor in order to prepare for the exams. One of them noted: "*it is a blessing to have it because it helps me so much to improve my academic performance and get ready for my exams.*" Nevertheless, the reliance on AI fosters immediate improvements to learners' knowledge gaps, generates ready models to check one's understanding in addition to encouraging self-regulated learning. However, efficient exams preparation requires deeper cognitive scaffolding and conceptual clarity.

b- AI & Cognitive Scaffolding: by segmenting explanations of related learnt content, students can internalize analytical competence and hence self-dependency increases. The augmentation of guidance, monitoring and regulation performed by AI tools functions as a mediator of instructional support and the development of leaning skills. Owing to this, problem solving strategies can be used as an active aid while refining learners' authentic thinking. A student advocates that: "*I learnt a lot of strategies those related to presentations, I feel more confident now.*" Furthermore, when AI support is implemented strategically, learners can customize its use based on their preferences, needs, lacks and requirements. Since learner autonomy is a self-managed process, paving the way to one's own pace of engagement reduces judgments and ultimately leverage responsibility from one side and improved outcomes from the other. In spite of the functionalities provided, using it with caution remains indispensable as a student concluded: "*it can propose a topic according to your own choice, so it is beneficial.*"

c- Flexible Language Mediated Learning

As far as the use of AI is concerned it tends to equip participants with the needed accessibility not solely in terms of adaptability but also providing a multi

model of resources in addition to a fitted format of learning paths that adequately reduce barriers such as: time constraints and non- flexible learning practices. A student acknowledged:” *I usually get instant explanations of different topics and their investigation I also translate sometimes quickly and efficiently without seeking help from anyone*”. It is well highlighted that AI has become an equivalent to immediate facilitator which is able to answer questions, explain, summarize and even suggest multiple manners of feedback. Since learners are required to be assessed according to the extent of their understanding, AI personalized treatment revolutionizes the way through which students can be able to accommodate to diverse educational experiences. A student mentions: *“it is programmed to reach each individual's capacity.”* Regardless of the aforementioned advantages, a student confesses that:” *it is great to get answers but don't rely on it too much*”.

2- AI tools Impact on Learners' Autonomy

Phase One: Familiarization with Data

The introductory review of data regarding the second research question posits overlapped insights towards AI as a resource that fosters self-reliance and autonomy. Many participants indicate that AI enables learners to reinforce self-

assessment and monitor their academic progress. A student says: *“AI can indeed foster greater self-reliance in individuals by providing access to vast amounts of information and resources. AI empowers users to seek answers and solutions independently.”* While AI tools are systems that have contributed to personalize students' learning practices, the extensive uptake of it may cause uncontrolled manipulation at the expense of students' meta cognitive abilities. Then, another student admits that:” the excessive use of AI tools as if they replace your brain makes one less self-reliant however I use it wisely in a way that helps me keep my self-reliance safe.”

Phase 2: Generating Initial Codes

In this phase, multiple codes were captured illustrating the link between AI and learner- centered learning. The codes below are identified as follows:

- Reliance on AI: referring to the dependence on AI as an automated tool in order to perform different tasks in concerned domains.
- Over Reliance Risks: the increasing over reliance on AI systems makes humans critical thinking and cognitive abilities sidelined though AI supported systems are meant to serve as facilitators.

- **Errors/ Misinformation:** despite refined tasks that can be performed via AI tools on the traditional pedagogical practices they can in parallel represent misleading outputs, errors commitments and incorrect information.
- **Awareness of Limitations:** given that AI is a machine-based system, reconsidering any infallible data is a mere consequence of the harmful outcomes. It is wiser to safeguard users' safety and ensure their well-being.
- **Developing Autonomy Strategically:** there is a renewed attention given to AI mediated learning environment, paving the way to self-regulation and independence.

Phase 3: Searching for Themes:

The aforementioned codes were gathered in terms of three main themes grouped in the table below:

Themes	Sub-Themes	Interview Excerpts
AI Dependency & Diminishment	Dependence on AI	<i>Yes, we are becoming more dependent on AI for work, learning but still we can have the final decision.</i>
	Reduced self-reliance	<i>It made me rely on it more than myself I sometimes find problems doing things on my own.</i>
	Awareness of limitations	<i>I feel that these pieces of information are not enough or even misguided so I need to do</i>

Metacognitive & Errors Monitoring	Critical Thinking	<i>more research on Google and trustworthy sites.</i> <i>It taught me a lot of things like making investigations and reaching details I could not understand.</i>
AI & Learner Autonomy	AI strategic use	<i>I use AI tools such as GPT for answering questions, Grammarly for writing assistance and Duolingo for languages learning.</i>
	Developing Autonomy	<i>It can help me with self-learning but excessive dependence may reduce critical thinking and problem solving skills.</i>

Table 2: AI tools Impact on Learners' Autonomy

Phase 4 5 and 6 reviewing, defining and reporting themes:

a- Dependency & Diminishment

The use of AI in higher education has expanded to students thereby shaping progressively new forms of learning. Currently, authority lies in learners' engagement and responsibly taking charge of their pedagogical experiences vis à vis AI devices. Though, it is worth mentioning whether self-reliance has dramatically becoming vulnerable on the artificial intelligence. Grounded in the interview conducted, a participant mentions:” *honestly it does because it multiplies the sense of laziness and dependency; it pushes me to make more investigations to check the information critically*”. Moreover, the ability to offer continuous feedback and reflections opens new ways about self-monitoring skills enhancements. Another student advocates:” *AI has become a mentor and a colleague since it helps me with*

homework, supports my ideas, it also provides me with explanations and lectures." There is an attribute which explains that AI use re-conceptualizes a new form of self-reliance among some participants largely associated with "*my only supported infrastructure*". From a pedagogical perspective, AI tools facilitate autonomous learning by allowing personalized navigation of their learning process. It is noteworthy to add that over reliance on technology without a strategic plan may hinder students' resistance and problem solving skills. One participant described: "*IA helps me learn independently but if I rely on it too much it can reduce my problem solving skills.*" The relationship between AI mediated learning environment and learning autonomy is thought-provoking since it raises inquiries about the true meaning of being *free learner*. It is all about reaching steady AI use choices.

b- Metacognitive & Errors Monitoring:

Despite being universally spread, it is remarkably constrained by several boundaries. It remains a challenging tool whose default is to replicate human's cognitive and interactive capacities. Based on one of the interviewed students, one of them says: "*AI has limitations since it can include misinformation, lack of human judgments and over alliance on AI generated content*". Within the same

line of thoughts, another participant added: "*AI makes mistakes and gives wrong information and wrong structures for my essays.*" In particular, being over dependent on pre-programmed algorithms, AI tools remain very limited in terms of scrutiny, wrong information, misleading data and limited conceptual explainability can impair its accountability. Additionally, any gap that can be showcased is generally affecting learners' knowledge internalization capabilities in case its content is adapted blindly without reaching reliability and validity. Furthermore, over reliance on AI tools can also affect students' critical thinking through the reduction of their involvement in reflections and reasoning. There is a risk that learners consider any AI content generated passively marginalizing intellectual and cognitive activities. A student declares: "*AI facilitates the process of learning through providing analysis, finding a deeper understanding of any given topic.*" AI should remain a complementary support rather than a full substitution to learners' mental and critical processes.

c- AI and Learner Autonomy:

While AI has spread over the students' academy context due to its constant accessibility, learner autonomy emerges as a central parameter resulting from it. The pre mentioned correlated concepts

can be adjusted accordingly only if AI means are used wisely without an authoritative role. In this sense, AI is not an exact guarantee to satisfactory ownership of various educational processes. Autonomy requires a plethora of skills and mechanisms allowing students to remain responsible for one's learning by giving access to critical engagement and thoughtful involvements. A student affirms: *"through AI I learned new vocabulary, acquired different pieces of information related to my major and enhanced my way of making research."* What is more, autonomy can be effectively reinforced when students reach awareness about AI that is solely a means of educational endorsement rather than being an infinite gadget of information supplier. A student shared: *"it depends on the way we use it for example I use it to collect species of information and I am able to do the rest of the job."* Another one adds: *"yes it does make me self-reliant."* Among the considered points, learners' autonomy also shapes students' ability to internalize knowledge for a lifelong learning process; it intersects with AI only if learners' linguistic awareness and metacognitive skills are not weakened. AI use should actively promote goal setting, adaptive strategies and ongoing feedback.

4. Discussion of the Main Findings

RQ1: How do students use and perceive AI tools in supporting their academic learning?

Based on the main findings, AI driven learning environments have shaped a reframing of technology use especially at the higher educational system. The current study indicates those perceptions towards AI use in relation to post-graduation academic demands especially at the Master's degree. While AI affords personalized learning, its effectiveness is highly dependent on students' capacity to operate within the digital ecosystem. In this regards, (Chen et al, 2020 p.02) acknowledge that the future developments of education will be closely related to the development of AI. The study detected that participants regard the interplay between individualized meaning construction and artificial intelligence support as increasingly normalized. As such, there exists a reconfiguration of learning mechanisms often intervened with AI based learning system, changing gradually the traditional learning environment. Though, data obtained, demonstrate that the traditional educational system can be easily reshaped due to AI extensive widespread utility and this goes aligned with (Chassignol et al, 2018).

In higher education, technology use stands out as crucial, showcasing flexibility and accessibility at the disposition of learners. Hence, (Bozkurt, 2020) questioned whether we shall learn with technology or learn from technology. One can question whether learners' cognitive capabilities are not pushed aside by the accelerated use of electronically driven technologies. From a cognitive perspective, there is an awareness of the necessity to use AI tools as a way to regulate problem solving processes and to minimize any gaps related to the lack of knowledge and comprehension. Additionally, the shift from an extensively instructor's guided assistance to a personal empowered model allows more opportunities to navigate complex analytical processes. Aligned with (Wei, 2023) findings indicate that AI assisted tools are accessible on either computers or mobile devices often facilitate language learning. This study also shows that students regard the intensified AI rich environment as a mere essence behind the unrestricted reliance on it, redefining learning trajectories along with newer prospects for self-directed cognitive development. It was also found that AI enables learners to find immediate solutions and problem solving strategies

which consequently affect their educational engagement and competence.

RQ2: How does the use of AI tools influence learners' autonomy?

Understanding the role of learning autonomy is not limited to take responsibility upon the academic performance but also to open possibilities for cognitive growth. Currently, AI existence suggests an intricate involvement for the sake of strengthening learners' metalinguistic awareness to become active agents in today's data- dependent world. Based on (Annamalai et al, 2023) those Chatbots were deemed to satisfy competence and autonomy alike. Notwithstanding, the research outcomes explained learners' discernment about the over-dependency on AI tools resulting new forms of self-directed learning which shifts attention from competence building to only tasks performing duties. Interestingly, maintaining learners' responsibility and willingness to take charge of their learning. In counterpart, the realization of a constructive academic development is doomed to become mitigated. Presently, the framework of "*learner autonomy*" foster learners' intellectual qualities though interrupted by challenges such as: susceptibility, over reliance, and the lack of

experiential understanding. All of which activate a consensus that AI remains limited. This goes in line with (Lan, & Zhou 2025) who point out that the limitations of AI represent a burden against higher education growth.

Once alerted, the normalization of AI as a cognitive support system to learners is akin to developing critical and communicative skills (Chu et al, 2022). The findings illustrate a sense of cautious optimism in regards to the AI ability to construct a reliable sustenance to evaluate, analyze and refine targeted contents. Thus, critical thinking can be already shaped by acknowledging potential limitations and passive information tackling. Adequately, AI is a tool to improve and never to replace human's reasoning abilities. There should be a balance so as the guarantee vigilant use while dealing with autonomy as a guided choice constructed upon reflective and measurable selections. Taken together, in university education, there is a newly deeper understanding in regards to the scope of autonomy, reflecting a sizable shift to alternative learning avenues that transcend old mostly dominated by teacher-centered approaches chained by standardized assessment. AI inclusion advocates moving beyond the transition of knowledge via lecture-based instruction to

an independent access to multiple complex learning opportunities.

On the whole, this study shows that the interviewees perceived the use of AI as a learning aid, complementary to a certain extent as an unavoidable in another. Thus, digital transformation requires a thoughtful evaluation within the current higher educational system environments. Though, it should be used ethically since its main concern is *"to make life easier"* (Fitria 2023). Situated within a flexible stability, AI spread has identified learners' engagement at a regular basis. However, there is a problematic that raises questions and concerns as Butson, & Smith (2024) indicate that AI is a tool that enhances people's competencies rather than becoming a programmatic habitual task. This observation reflects the heterogeneous reliance on AI. Similarly, it remains challenging to rectify manageable objectives behind AI since it is highly embedded within learners' daily academic tasks. Presently, while learner autonomy is directly linked to users' learning behavior in a purely digital world (Abulibdeh et al, 2024) pointed out that AI brings about either promises or complexities especially in the field of education. Accordingly, the integration of AI has contributed to efficiency, productivity, scaffolding and

problem solving problem meanwhile it can also cause flows in terms of misuse, unethical treatments and biased perspectives.

5. Implications:

It is compulsory to revise learning autonomy vis-à-vis the presence of AI by providing it with closer pedagogical and scholarly alertness:

- ✓ Despite the inescapable impact of technology students are required to make equilibrium decisions in regard to their academic knowledge externalization.
- ✓ Being self-reliant is no more enacted through personal autonomy mechanisms though it is aided by AI interaction Chatbots prudently.
- ✓ The over-dependency on AI can limit the ability of self- correction and collaboration between peers.
- ✓ Learners should actively use AI strategically instead of total substitution.
- ✓ Self-monitoring skills remain pivotal for long-term retention and constructed communication consolidation.

6. Limitations

Among the limitations of current study are the following:

- The reliance on qualitative data may lead to biased responses.
- The small sample size affects the generalizing findings.
- Future longitudinal studies can cover further insights about the interplay between learner autonomy and AI at the Algerian University level.

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