International Journal of Linguistics, Literature and Translation
ISSN: 2617-0299 (Online); ISSN: 2708-0099 (Print)
DOI: 10.32996/ijllt
Journal Homepage: www.al-kindipublisher.com/index.php/ijllt

IJLLT
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Investigating Opportunities and Challenges of Integrating Artificial Intelligence into Moroccan EFL Classroom Practices

Enaim Rachid[1], Achraf El Khalifi[2] and Abdelaaziz COURR[3]

[1] *Ibn Tofail University, Kenitra, Regional Center for Education and Training Professions (CRMEF) – Rabat*

[2] *Mohammed V University, Rabat*

[3] *Regional Center for Education and Training Professions (CRMEF) – Rabat, Faculty of Educational Sciences- Mohammed V University, Rabat*

Corresponding Author: Enaim Rachid, **E-mail:** Enaimrachid@gmail.com

| ABSTRACT

Artificial Intelligence (AI) has had a significant impact on language education worldwide. This article investigates the effectiveness and limitations of AI integration in Moroccan EFL classrooms. It addresses this issue through a mixed-methods design, combining quantitative data (questionnaires) and qualitative data (semi-structured interviews). Data analysis has shown that despite international recognition of the evidence of AI's pedagogical efficacy, Moroccan educational policymakers have not yet invested significantly in this area. It also demonstrates that there is a growing acknowledgment of AI tools' effectiveness, but their integration faces several challenges, such as a lack of relevant professional development, inadequate infrastructure, and the absence of institutional policy. The study concludes with some recommendations for AI integration in Moroccan EFL classrooms.

| KEYWORDS

Artificial Intelligence, EFL instruction, Moroccan secondary education, mixed-methods research, teacher perceptions, technology integration, language learning

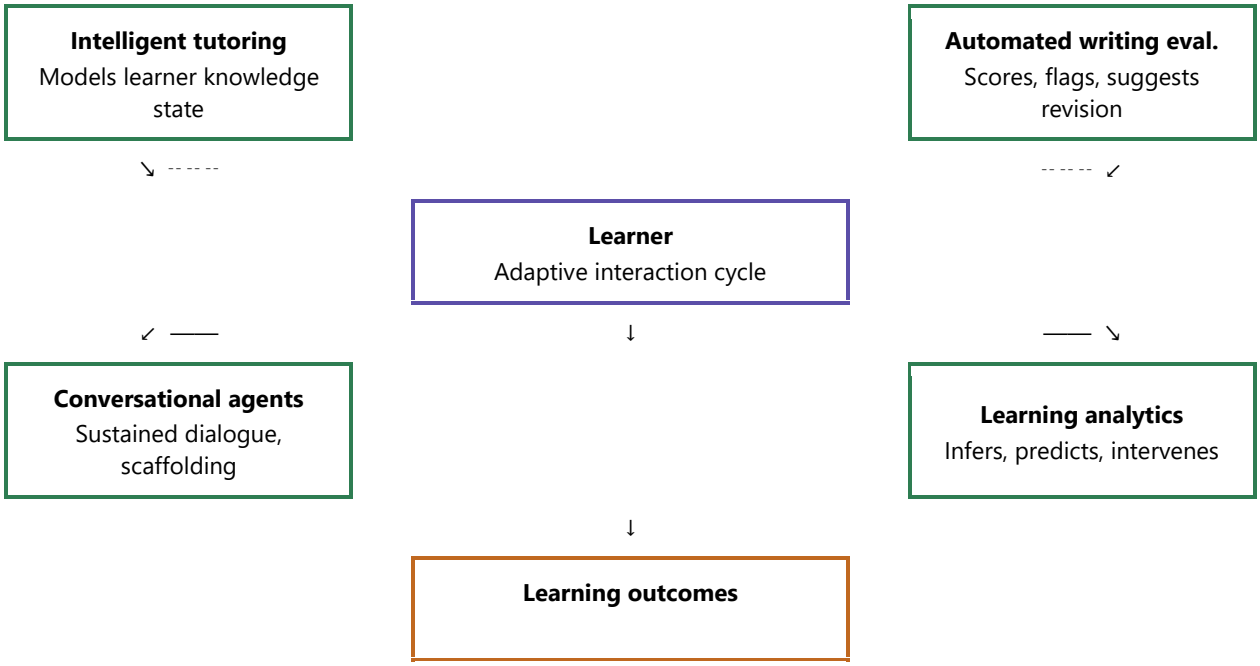
| ARTICLE INFORMATION

ACCEPTED: 01 May 2026 **PUBLISHED:** 08 June 2026 **DOI:** 10.32996/ijllt.2026.9.6.7

Introduction

AI tools have been used to learn foreign languages, including automated writing-evaluation systems, machine translation tools, intelligent learning management systems, chatbots, and virtual learning environments (AlTwijri and Alghizzi, 2024). AI has reshaped educational systems worldwide thanks to automated writing assessment and conversational agents. According to Torres and Kahveci (2025), AI tools empower learners with opportunities that are not always available in classroom settings. They can provide personalized instruction with sustained interaction and real-time feedback.

Figure 1. The learner-centered adaptive interaction cycle



Note. —— Solid = system output to learner ---- Dashed = learner data to system

The diagram is an architecture that puts the learner at the central node, surrounded by four AI-mediated subsystems positioned at each corner. The visual logic encodes two distinct relationships through arrow type: solid lines represent the flow of instructional output from each system toward the learner. In contrast, dashed lines represent the return flow of learner data back into each system. This bidirectionality is the diagram's most theoretically significant feature, capturing the adaptive loop that distinguishes AI-powered instruction from static content delivery. The three main AI tools and their usages are:

1. **Intelligent Tutoring** that can be used to model the learner's knowledge state and adapt instructional sequences accordingly.
2. **Automated Writing Evaluation** is used to score written output, flag errors, and may suggest revisions if needed.
3. **Conversational Agents** to sustain conversations and provide scaffolded interactional support.

This study is an academic endeavor to address this research gap using a mixed-methods design. It uses both questionnaires and semi-structured interviews. It addresses four research questions:

1. To what extent are AI tools integrated into Moroccan high school EFL classrooms?
2. What are Moroccan EFL teachers' perceptions of AI integration in relation to their technological, pedagogical, and content-related teaching practices, and what is its impact on the learning/teaching operation?
3. What are the main opportunities and challenges that may hinder AI integration in the Moroccan educational context?

Literature Review

Theoretical Framework: TPACK and AI Integration in EFL Education

This study is built upon the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (2006). It is a useful framework to explain how teachers integrate technology into classroom practices. The framework builds upon Shulman's notion of Pedagogical Content Knowledge by introducing technological knowledge as a third major domain of teacher expertise. Effective technology integration occurs when teachers manage to successfully combine technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK).

The relevance of TPACK has become more evident with the emergence and progress of Artificial Intelligence in education. AI tools, especially ChatGPT, Grammarly, Duolingo, automated writing feedback systems, and conversational agents, are believed to provide great learning opportunities. However, their effectiveness depends on teachers' ability to integrate them into meaningful practices

for the sake of meeting specific learning objectives. Within the Moroccan educational context, TPACK offers a useful framework for understanding the gap between positive perceptions of AI and its limited classroom adoption.

The Empirical Effectiveness of AI in Language Education: Meta-Analytic Evidence

The effectiveness of AI integration in language education has recently attracted the attention of practitioners and theorists worldwide. It has become the heart of all debates around the development of contemporary pedagogy. Torres and Kahveci (2025) conducted one of the most comprehensive quantitative studies to demonstrate the importance and efficacy of AI integration in language teaching/learning. They claim that AI tools enhanced instruction and learning. As a result, learners showed great mastery of language skills and communicative competence.

Wang (2024) conducted a crucial study on the effectiveness of integrating AI tools into teaching English across different levels and contexts. He employed a random-effects model to demonstrate the effect size in reading and grammar accuracy. AI tools may lead to efficient outcomes when properly integrated in the educational system in teacher-led contexts instead of substitution, a finding with clear evidence and implications for the Moroccan contexts, the present case study. The previous studies' findings and implications can be corroborated by Jeon (2025), who published 24 reviews about AI integration in language education. AI tools are effective when used in blended instructional models that maintain student-teacher interaction and the dominant mode of work in language classes.

AI and Learner Engagement: Mechanisms and Outcomes

Learner engagement is one of the pillars of effective teaching/ learning. It is about learners' cognitive, emotional, and behavioral involvement in learning processes. When learners are not engaged, teachers have to cope with several challenges, such as lack of attention and motivation. Teachers are supposed to invest the necessary cognitive energy to engage learners for the sake of enhancing their interest. Lack of engagement lowers learners' motivation because disengagement leads to a disconnect from content and the classroom environment. As a result, teaching may take place, but learning becomes superficial if it happens only once.

Given the importance of learner engagement, the central question has become how to boost learner engagement using AI tools. Recently, a group of researchers has attempted to come up with studies that investigate the role of AI in enhancing learner engagement. Ma and Chen (2024) conducted a thorough study to demonstrate the effects of AI-empowered applications on EFL learners' cognitive and emotional engagement. They used a pre- and post-test design with 186 Chinese EFL university students to measure the impact of AI-empowered apps on cognitive engagement and academic procrastination. Their findings showed that AI-empowered applications significantly improved cognitive engagement while reducing academic procrastination, suggesting that well-designed AI tools can sustain learners' attention and effort over time.

Kundu and Bej believe that AI has a great deal of impact on learner engagement. They claim that AI enhances learner engagement through five main ways:

1. Immediate feedback is crucial to reduce uncertainty and anxiety.
2. Gamification that engages learners through creating an enthusiastic classroom environment.
3. Personalization of instruction that maintains the challenges of meeting learners' needs.
4. Conversational interactions to stimulate 'authentic' communicative practice.
5. Progress-check dashboards that help observe learner improvements. (Kundu and Bej, 2025)

This is very relevant for the Moroccan context, where teachers' roles are limited by large class sizes and institutional constraints. AI-mediated tools can be complementary pedagogical support to enhance learning beyond the classroom walls. Immediate corrective feedback is a crucial instrument for enhancing learning. This principle reduces learners' uncertainty by providing real-time corrections, thereby minimizing misunderstandings and fossilizations. This immediacy lowers foreign language anxiety as it allows learners to correct their mistakes in private without the psychological load associated with the classroom environment. There is an evident chance that learners remain engaged and attentive. Gamification is an effective tool to sustain and enhance learner motivation and autonomy. Learners enjoy games more than ordinary classroom tasks. They show great persistence in tasks that are usually challenging in ordinary settings by adjusting the task's difficulty level and providing personalized feedback in a differentiated manner. By this token, AI tools may be a great help to meet learner needs. Conversational agent interactions enhance 'authentic' communicative practice and sustain learner engagement through meaningful dialogue. Research also confirms that AI integration enhances affective factors thanks to personalized and real-time feedback. AI tools are effective in creating an interactive learning environment, accessibility and flexibility in terms of place and time, and autonomous learning opportunities (AlTwijri and Alghizzi, 2024).

However, integrating AI into language learning is not an easy decision that can be made in seconds; however, it should undergo rigorous research to assess its effectiveness and limitations. AI integration in education is promising, but there is little known about this in academia. Due to a lack of resources on integrating AI into the Moroccan education system, this study may guide future teachers and policymakers to investigate the efficacy and constraints of AI integration in language education. The studies mentioned earlier have played an important role in paving the way for upcoming studies, yet they do not help educational practitioners draw concrete conclusions about whether AI is going to be effective for enhancing learning or another obstacle that hinders learning.

Challenges and Structural Risks of AI Integration

There are many attempts to enhance the effectiveness of AI integration in language education, yet such initiatives face serious challenges due to structural and pedagogical constraints and infrastructural inadequacy. The use of AI technologies requires a range of material and technical conditions. Integrating AI into language teaching/learning requires ongoing maintenance, which is contingent upon qualified staff. For Morocco, this remains unattainable.

Another critical constraint that prevents the integration of AI in education is teacher preparedness. Teachers' technological self-efficacy and their AI-specific pedagogical content knowledge are among the strongest predictors of meaningful classroom integration (Jeon, 2025). However, in the Moroccan context, pre-service training and professional development courses have prioritized pedagogical training that does not include AI integration in education/language learning. This creates a gap in integrating AI into language education due to a lack of specialized staff. Teachers may either underestimate the power of AI in language teaching or use it in spontaneous ways that do not usually align with established objectives. It would be wrong to assume that AI integration is a purely technical choice; rather, it calls for thorough pedagogical knowledge/ competency, because teachers should know when, why, and especially how to use a given tool rather than another.

Along with teacher preparedness, there are other pedagogical constraints, especially those associated with learning cognition and autonomy. There is always the risk of over-reliance on AI, which will definitely affect learner self-regulation and autonomous language use. Although reliance on AI tools can enhance learner engagement, it may also end up promoting surface-level learning strategies (Kundu and Bej, 2025). Generative AI tools usually provide accurate language use without triggering learners' cognitive abilities. They discourage critical thinking and cognitive awareness, which are crucial for learning languages. In the Moroccan context, where learners sit for summative tests, the use of AI undermines the communicative competence that language education aims to achieve.

The ethical dimension of AI integration in language education is another area of concern among EFL practitioners and policymakers. Indeed, AI tools and systems are not neutral; they are shaped by choices that may lead to unintended consequences (Jeon, 2025; AlTwijri and Alghizzi, 2024). Frequent AI tools learners rely on to enhance their learning, such as automated writing feedback, grammar correction, etc., are nurtured by cultural aspects derived from economically powerful nations, which will reinforce the structural inequalities and result in cultural dominance. This is what has been termed *epistemic injustice* (Fricker, 2007). Learners may end up praising foreign cultures at the expense of their own. AI tools reinforce monolingual ideologies embedded in mainstream EFL pedagogies.

AI Integration in Developing Educational Contexts

Literature review has shown that the majority of studies have been conducted mainly in Western contexts characterized by high levels of digital infrastructure and access to various technological tools. The transferability of these studies remains a crucial question of validity if applied in developing contexts. This problem reinforces digital inequality, which is a key factor in AI adoption in language education. Such inequality is not a matter of possessing devices; it reflects the digital literacies and the institutional capacity to integrate AI and technology in general into coherent pedagogical frameworks. It would be wrong to assume that the results obtained in a context will function well in others. This problem should push researchers and practitioners to look for ways to develop their own views of AI integration in education, EFL in this case, because when they want to exploit research and/ or literature, they find studies conducted in contexts that are different from theirs.

The Moroccan context is a good case study for examining the intersection of digital inequality and AI integration in language education. Morocco is not one of the world's most deprived educational systems, yet at the same time, it is not among those that enjoy full support of AI instruments. Moroccan decision makers have always recognized the importance of ICT in education. It is in this context that successive Moroccan governments have invested in crucial initiatives that aim to integrate technology in education, such as the GENIE program, Microsoft Office Specialists training, etc. However, these initiatives have not been very effective because they have resulted in persistent disparities between regions in terms of infrastructure quality and sustainability (AlTwijri & Alghizzi, 2024).

Observing some classrooms raises the question of the difference between nominal and functional access. The first refers to the presence of devices, while the latter is about the reliability and sustainability of technical support. This binary position is significant because the integration of AI in education depends more on functional access instead of the mere presence of technology per se. A classroom that is equipped with old/ aging computers can satisfy policy at the official level, while being unfruitful for the actual use of AI tools. Another serious attribute of the Moroccan context is disparity in digital literacy among learners whose exposure to AI varies across different regions and teachers whose pre-service training has less attention to digital application in language education. Even those teachers who can be described as technologically self-efficacious have not been effectively trained through professional development. They will have to deal with the lure of AI tools and the challenge of pedagogical realization.

The practical outcome is the mismatch between AI potentiality and learners' needs. Educational AI tools, such as Speak, Talkpal AI, MySivi AI, etc., are used to learn basic courses, but without caring for foreign learners' specificities and needs. The focus on Standard English norms will not recognize the influence of L1 or French syntactic structures on learning English. Feedback mechanisms do not correspond to learners' development needs. A thorough analysis of the aforementioned tools reveals that language acquisition/learning follows the same pathways as if all were native speakers of English, with a strong emphasis on idiomatic expressions to enhance learners' communicative competence. There are no ways to differentiate teaching practices, assuming that learners are identical.

In brief, data collection and literature review have shown that despite the rapid growth of research on AI integration in education, developing contexts, such as Morocco, as a case in point, have not yet engaged in effective studies to assess the efficacy and limitations of AI in education. However, the questions that matter most in the Moroccan context are: how do Moroccan EFL teachers perceive and navigate the integration of AI in language teaching/ learning? And what adaptations or pedagogical framings are required to integrate AI in teaching English?

Methodology

Research Design

This study uses a mixed-methods design by combining both qualitative and quantitative data, which were collected but analyzed independently. This choice can be attributed to the nature of the issue under investigation. It calls for situating data within broader patterns of perception rather than narrowing the research approach to a single mode of inquiry. The research questions are multi-dimensional and require standardized survey instrumentation, statistical analysis, and interpretation, because surveys without qualitative interpretation may yield findings that are misleading and meaningless. Similarly, it would be hard to situate qualitative data within the broader framework without quantitative data. This research design (convergent mixed-methods design) facilitates researchers' mission in this field due to the lack of previous studies. It suited the exploratory nature of the present study. This study is based on a pragmatist viewpoint, which holds that research questions drive all methodological decisions (Tashakkori & Teddlie, 2010). The TPACK framework informed both instrument design and data interpretation. Questionnaire items concerning AI use, perceived benefits, and barriers were developed to capture dimensions related to technological knowledge, pedagogical application, and classroom implementation.

Participants and Sampling

This study relies on purposeful sampling as it recruited participants from EFL teachers from public schools across the Rabat-Salé-Kenitra region from both urban and rural contexts in the region. This choice was made on purpose and methodologically motivated. It was intended to ensure that the sampling selected reflected various characteristics of Moroccan secondary education. Initial contacts were established through institutional procedures to guarantee participants' safety. Most participants were EFL high school teachers with at least 1 year of teaching experience.

The quantitative strand of this study involved 78 Moroccan high school English teachers. Participants' teaching experience ranged from 1 to 27 years, which indicates a sample with substantial professional experience. The sampling may create a representation problem, but a pool of 78 participants is adequate for the exploratory analysis. The study could have included other potential participants, but there was a sense of saturation because their answers were identical, especially with the qualitative data. The qualitative strand involved twelve EFL teachers drawn from the same purposeful sample, selected to ensure a balance of urban and rural school contexts and a range of teaching experience. Sample size was determined by thematic saturation, with saturation deemed to have been reached when no substantively new themes emerged from successive interviews (Guest et al., 2006).

Instruments

Questionnaires

Before gathering data, I had gone through a systematic review of instruments used in previous studies on AI integration in education. The present study made the questionnaire its main data collection tool. The questionnaire encompasses four main sections:

1. Demographic and professional background information.
2. AI tool usage frequency and diversity.
3. Perceived pedagogical benefits of AI.
4. Perceived barriers to AI integration

Each section entails several items based on the type of issues targeted. Representative items of each section of the questionnaire are summarized in Table 1.

Questionnaire development followed a systematic, multi-stage process. Drawing on the instrument review, an initial pool of 32 items was generated to cover all four sections. To establish content and face validity, the draft questionnaire was submitted to two EFL specialists with experience in technology integration research. They were asked to assess whether each item adequately captured its intended construct and whether the language was appropriate for Moroccan secondary school teachers. Based on their feedback, some items were either removed for clarity to avoid redundancy. This resulted in a final instrument of 26 items. This expert review constitutes an important step toward ensuring that the questionnaire measured what it was intended to measure. This is validity evidence that is especially important in contexts where AI-related terminology may carry different connotations across educational settings.

The article used a pilot study with ten EFL teachers from the same region before administering the questionnaire to the main sample. The purpose of the pilot was to identify items that were ambiguous or culturally inappropriate. Participants were asked to complete the questionnaire and to skip any items they did not feel like answering. Minor wording adjustments were made following the pilot, particularly to two items in the barriers section where teachers reported uncertainty about the intended meaning of the term 'institutional policy.' The pilot data were not included in the main analysis.

Table 1. Representative Questionnaire Items by Section

Section	Sample Item	Scale
AI Usage Frequency	I use AI-powered tools (e.g., ChatGPT, Grammarly, Duolingo) in my English language teaching.	Never – Daily (5-pt)
Perceived Benefits	AI tools help to improve my students' level of engagement with learning tasks.	SD – SA (5-pt)
Perceived Benefits	AI provides timely and personalized feedback that supports individual student progress.	SD – SA (5-pt)
Barriers	I feel confident in my ability to integrate AI tools effectively into my pedagogical practice.	SD – SA (5-pt)
Barriers	Insufficient technological infrastructure in my school prevents me from using AI effectively.	SD – SA (5-pt)

Semi-Structured Interview Protocol

To collect qualitative data, this study employed semi-structured interviews. The protocol comprised 18 open-ended questions organized around five main interrelated themes:

1. The first revolves around the theme of participants' current AI-related classroom practices. It examines tool repertoire by exploring the instruments teachers integrate into their teaching processes. This domain seeks to see whether teachers who use AI tools are pedagogically aware of their decisions and choices.
2. The second seeks to measure the impact of AI on learner engagement and learning outcomes. This part encourages teachers- participants- to reflect on both the advantages and drawbacks regarding reliance on AI tools to enhance language education, EFL in this case.
3. The third theme tackles the institutional support and professional development, which capture participants' structural and organizational conditions that normally shape teachers' freedom to integrate AI tools in their teaching. It explores formal training and professional development opportunities.
4. The fourth domain deals with educators' concerns regarding learners' over-reliance on AI and the ethical dimensions of AI use in teaching English. It invites participants to voice their concerns from a professional standpoint rather than personal reflections.
5. The fifth theme solicits some recommendations for both policy and practice. Participants can draw on their knowledge and experience to suggest some solutions/ strategies for institutional policy development and curriculum design.

Interviews were conducted in English. Each interview lasted between 45 and 60 minutes, which was enough to explore different issues related to the topic. Based on participants' desire, interviews were not recorded. I had to take notes and analyze them on the spot to maximize data accuracy. Briefly, interviews took place according to participants' comfort level, abiding by ethics in collecting qualitative data.

Ethical Considerations

Before data collection, ethical approval for the study was obtained from the institutional review board of the lead author's home institution. All participants showed a great deal of desire to provide help and were fully made aware of their right to withdraw without penalty at any stage. Participant anonymity and data confidentiality were protected through the use of pseudonymous identifiers throughout the research process. Given the potential professional sensitivities of teachers' accounts of AI use in institutional settings, particular attention was devoted to ensuring that interview data could not be attributed to identifiable individuals.

Data Analysis

Before embarking on analysis, quantitative data derived from questionnaires were inserted into SPSS. Descriptive statistical analyses were conducted to generate frequency distributions and measure the dispersion of all scaled items. The study employed a series of inferential statistical procedures to be able to examine group differences in AI adoption and attitude profiles (gender, years of teaching, school location). One-way analysis of variance was used to categorize groups based on teaching experience, urban vs rural schools. However, knowing that statistical significance is not sufficient for effective interpretation, effect sizes were employed.

Before the main analysis, the study relied on Cronbach's alpha coefficient to establish the internal consistency of the two Likert-scale subscales. The Perceived Benefits subscale (seven items) returned a coefficient of $\alpha = .87$, and the Barriers subscale (seven items) returned $\alpha = .83$. Both values exceed the conventionally accepted threshold of .70 (Cohen, 1988). This indicates that the items within each subscale measure a coherent underlying construct. These reliability statistics provide confidence that the descriptive and inferential analyses reported below are grounded in consistent measurement.

Data analysis was the major obstacle this study faced. Participants refused to be audio-recorded, but immediate verbatim notes were taken during each interview, which aligns with the best practice recommended for non-recorded data (Tessier, 2012). The qualitative data, generated from semi-structured interviews, went through rigorous analytical processes. These records were reviewed for completeness and internal consistency before importing them into NVivo 14, which is a data analysis software platform used to facilitate systematic organization, coding, and retrieval of qualitative data.

To strengthen the credibility of the qualitative analysis, the study used inter-coder reliability. A second researcher was asked to code 30% of the interview data. Codes and themes were then compared between the two coders. Cohen's kappa (κ) was calculated at .81, which indicates strong agreement and falls well within the range considered acceptable for qualitative educational research (Braun and Clarke, 2006). Discrepancies between coders were resolved through discussion until consensus was reached, which in several instances led to the refinement of theme boundaries and definitions.

This study used thematic analysis, which consists of six phases (Braun and Clarke, 2006). This choice is ascribed to the theoretical flexibility of Clarke's thematic analysis model and its compatibility with the interpretivist view. It followed a recursive process instead of a linear one in six steps:

1. ***Data Familiarization***: Becoming familiar with the whole dataset is the primary step, as it facilitates subsequent stages. McCartan and Robson (2016) state that "after initial data collection, give yourself time to immerse yourself in the data so you are really familiar with what you have collected".
2. ***Initial Coding***: "Phase 2 begins when you have read and familiarized yourself with the data and have generated an initial list of ideas about what is in the data and what is interesting about them" (Braun and Clarke, 2019).
3. ***Theme Development***: This step is conducted by analyzing and contrasting data, looking for potential themes as some codes may form a theme. In this context, Braun and Clarke claim that "the researcher constructs themes through analyzing, combining, comparing, and even graphically mapping how codes relate to one another. In inductive analysis, researchers derive themes expressly from the coded data, so the themes identified will be more closely linked to the original data and reflective of the entire data set" (Kiger and Varpio, 2020)
4. ***Theme Review***: Themes are reviewed regularly "until you feel reasonably satisfied'' (McCartan and Robson, 2016). Some of them are modified, developed, or sometimes deleted. Braun and Clarke argue that the researcher re-reads the entire data set to re-examine themes and to re-code for additional data that falls under the themes that have been newly created or modified in this phase, then revises the thematic map accordingly.
5. ***Theme Definition and Naming***: "Phase 5 begins when you have a satisfactory thematic map of your data... At this point, you then define and further refine the themes that you will present for your analysis and analyze the data within them" (Braun and Clarke 2019). Once themes are well-defined, they ought to be named.
6. ***Report Production***: This is the final step in thematic analysis, leading to the research findings. The manuscript should not be mainly descriptive, but it should weave a narrative that provides a clear, concise, and logical account not only of how a researcher interprets the data, but also why their selection of themes and interpretation of the data are important and accurate.

Results

Current Patterns of AI Tool Adoption

The quantitative findings of the study give a holistic and telling picture. It revealed a predominantly low to moderate level of AI integration among study participants- EFL teachers. As shown in Table 2, 18% (n= 14) reported daily/ frequent use of various AI tools in their teaching practices; on the other hand, 62% (n= 48) reported using AI instruments in their classrooms. Data analysis showed that teachers do not use the same tools: ChatGPT is the most frequently used (41%), and Grammarly (38%) is the second most used AI assistant, especially for grammar, spelling, and sentence structure refinement. Teachers claimed the use of language learning apps, such as Duolingo (22%), to enhance learning. 10% of study participants adopted the use of specialized AI-integrated EFL platforms, such as ELSA Speak and Quill.org.

Table 2. AI Tool Usage Frequency Among Participants

Usage Category	n	%	Most Common Tool(s) Cited
Never	16	20.5%	N/A
Rarely (a few times per term)	24	30.8%	ChatGPT, Grammarly
Occasionally (monthly)	24	30.8%	ChatGPT, Grammarly, Duolingo
Frequently (weekly)	10	12.8%	ChatGPT, ELSA Speak
Daily	4	5.1%	ChatGPT, Grammarly, Quill.org

Another significant finding of the study is the urban-rural disparities in AI adoption in language education. Teachers working in urban schools reported higher AI tool usage than those employed in rural areas ($t(76) = 3.24$, $p = .002$, $d = .74$). This disparity can

be explained by unequal access to the internet and technology devices. Data revealed that teaching experience is important but does not affect AI adoption frequency ($r = -.12$, $p = .29$). This may be explained by institutional infrastructure rather than personal factors like age or experience. As far as gender is concerned, the analysis revealed no statistically significant effect on AI adoption in language education ($t(76) = 1.08$, $p = .28$), suggesting that gender is not a meaningful differentiating factor in this sample.

These quantitative data are significant to have a clear picture of Moroccan EFL practitioners' perceptions of AI use in language education. However, such data remains static. It calls for deep interpretations to decipher the underlying usage patterns, motivation, and hesitations. Frequent AI users believe that they resort to AI tools because of learners' interest rather than institutional encouragement. One participant, working in an urban school with eight years of experience, claims: "My students were already using ChatGPT for their homework, so I realized I had to understand it myself and find ways to use it properly in class rather than just fight against it." This testimony indicates that teacher AI adoption is reactive towards learners' needs rather than supported by professional development or policy.

Teacher Perceptions of AI's Pedagogical Benefits

Teacher perceptions of AI's potential pedagogical value were positive and telling despite relatively low usage rates. As shown in Table 3, the benefits strongly endorsed by participants related to personalized learning, student engagement, and immediate feedback. More than 75% of respondents agreed or strongly agreed that AI tools have a great potential to enhance student motivation ($M = 3.89$, $SD = .72$) and to provide individualized practice opportunities that are impractical at scale within conventional classroom settings ($M = 3.81$, $SD = .78$).

Table 3. Descriptive Statistics for Perceived AI Benefits

Benefit Domain	M	SD	% Agree / Strongly Agree
Personalized learning opportunities	3.81	.78	75.6%
Student motivation and engagement	3.89	.72	78.2%
Immediate, actionable feedback	3.74	.81	71.8%
Support for differentiated instruction	3.67	.84	69.2%
Reduction in foreign language anxiety	3.52	.91	64.1%
Support for learner autonomy	3.44	.93	60.3%
Time efficiency for teacher feedback	3.61	.88	67.9%

Quantitative data provides broad perceptual patterns; however, to interpret them, the qualitative interview lays the groundwork for deeper insights and elaboration. Participants felt free to express their opinions and views during semi-structured interviews, as they provide more room for adding extra information. A participant with ten years of teaching experience in a Rabat-based high school claims: "When students receive immediate grammar feedback from the app and can see their errors highlighted and explained right away, they engage with the revision process in a way they simply don't when I write comments in the margin of their notebooks a week later." This attitude aligns with Kundu and Bej's (2025) mechanisms of AI-enhanced engagement in contexts where teachers' workload limits the availability of feedback and remedial work.

Another prominent theme that emerged from the analysis of interviews is a consensus among participants about the effectiveness of AI-powered adaptive platforms to meet learners' needs and, by extension, enhance learning. Instead of dealing with the class as a uniform community, AI tools help teachers differentiate their teaching methods. A participant states: "Because of the time constraints we have, as you know, we have to cover the entire syllabus assigned by the Ministry of Education to prepare for exams, we rely on AI to help us help low achievers according to their needs and level". Accordingly, AI tools boost learners' engagement and motivation as they feel included with these tools.

Barriers to AI Integration

Despite the positive attitudes participants have towards AI adoption, they identified significant infrastructural and pedagogical constraints that hinder AI integration in language education in Morocco. As illustrated in Table 4, the most serious barrier was the lack of training and professional development programs: 74.4% of participants (n = 58) agree or strongly agree that they were not trained to be able to use and/ or integrate AI into teaching practices. Additionally, infrastructural obstacles are the second constraint (68.0%; n = 53) mentioned by participants, along with the concerns about student over-reliance on AI tools rather than developing independent skills (57.7%; n = 45) and the uncertainty about assessment/ feedback mechanisms of AI tools (52.6%; n = 41).

Table 4. Prevalence and Nature of Principal Barriers to AI Integration (N = 78)

Barrier	n	%	Category
Insufficient professional training in AI pedagogy	58	74.4%	Professional Development
Inadequate school-level infrastructure	53	68.0%	Structural/Institutional
Concerns about student over-reliance on AI	45	57.7%	Pedagogical
Uncertainty re: AI-assisted work assessment	41	52.6%	Pedagogical / Policy
Absence of institutional AI policy or guidance	39	50.0%	Structural/Institutional
Academic integrity concerns	36	46.2%	Ethical / Pedagogical
Concerns about data privacy	24	30.8%	Ethical

The analysis of interviews can further interpret these findings. The theme of training scarcity/inadequacy is dominant across all interviews, regardless of participants' use of AI tools. A newly hired teacher claims: "We received training in using projectors and interactive whiteboards during our teacher preparation. Nobody talked to us about AI. I am learning from YouTube tutorials, which is not the same as proper professional development". This statement is prevalent among participants, which reflects a disconnect between learners' actual needs and teacher preparedness/ pre-service training, and professional development.

Infrastructural barriers are evident in rural and peri-urban areas, where the internet and use of technological devices, except mobile phones, are not highly frequent or sometimes absent. Many participants believe that even when teachers are qualified and possess pedagogical knowledge/ expertise to integrate AI tools, the absence of reliable infrastructures makes it harder to use AI in language education. In this context, a teacher, working in a rural school, states that "The network goes down two or three times a day. You cannot build a lesson plan around a tool you cannot guarantee will work." This testimony carries a deep complaint that overseas a single incompatibility between teachers' wishes and real practices. It indicates the working conditions in Moroccan rural schools, where teachers find it challenging to integrate AI in language education. The use of terms like "two or three times" refers to a chronic problem that reveals that unreliable connectivity is not an exception. The theme of learner over-reliance on AI emerges as a central issue that calls for deep analysis and interpretation. Teachers explicitly express their worries that learners use AI tools, especially generative AI chatbots, without making cognitive efforts. They may produce good language, but learning does not take place. This way, AI integration in language learning undermines the development of competencies intended to be learnt, developed, and used.

Table 5. Pearson Correlations Between AI Usage Frequency, Perceived Benefits, and Perceived Barriers (N = 78)

Variable	1. AI Usage	2. Benefits	3. Barriers
1. AI Usage Frequency	—		
2. Perceived Benefits	.44**	—	
3. Perceived Barriers	−.52**	−.31*	—

Note. *p < .05. **p < .01.

Convergence of Quantitative and Qualitative Findings

One of the central analytical commitments of a convergent mixed-methods design is to bring the two data strands into dialogue rather than reporting them in parallel. Table 5 above presents the correlation matrix for the three principal quantitative variables, and the patterns it reveals are meaningfully confirmed and elaborated by the qualitative data. The strong negative correlation between perceived barriers and AI usage frequency ($r = -.52$, $p < .01$) is the most telling quantitative finding in this regard. It indicates that the greater the structural and pedagogical obstacles a teacher perceives, the less likely they are to integrate AI tools, regardless of their attitudes toward those tools' potential. The qualitative data does not merely illustrate this pattern; it specifies its mechanisms.

The most prominent of those mechanisms, confirmed consistently across all twelve interviews, is the absence of professional training. The YouTube tutorials quote cited in the Barriers section above stands as a representative instance of a theme that recurred without prompting: teachers who are aware of AI tools, and in several cases enthusiastic about them, are left to self-educate because institutional pre-service and in-service training has not kept pace. This qualitative finding gives substance to the quantitative barrier prevalence data in Table 4, where insufficient professional training ranks as the leading obstacle (74.4%). The convergence here is not simply confirmatory; it deepens the interpretation. The survey data establishes how widespread the training gap is; the interview data reveals why it is so damaging — because in the absence of structured professional development, teachers adopt AI reactively rather than pedagogically, as the ChatGPT quote from the AI adoption section also demonstrates.

A second point of convergence concerns the relationship between perceived benefits and actual usage. The moderate positive correlation ($r = .44$, $p < .01$) in Table 5 indicates that positive perceptions do translate into higher usage, but only partially — a pattern consistent with the broader quantitative finding that 62% of participants use AI tools at least occasionally despite their broadly positive attitudes toward them. Qualitative data importantly complicates this: it reveals that the teachers most active in their use of AI are driven by learner-generated demand rather than personal conviction or institutional support, which calls into question whether this usage is pedagogically sustainable. Finally, the modest negative correlation between perceived benefits and perceived barriers ($r = -.31$, $p < .05$) deserves attention: it indicates that barriers and positive attitudes are not mutually exclusive in this sample. Many participants hold both simultaneously, recognizing AI's value while being structurally prevented from realizing it, which is precisely the tension this study set out to document.

Discussion

AI Adoption in Context: The Gap Between Potential and Practice

The most important and striking finding of this study is the discrepancy between teachers' positive attitudes toward AI's potential in language education and its adoption in classroom practice. This divergence is not a simple attitudinal resistance but rather reflects the constraints that hinder the translation of these positive perceptions into pedagogical actions. This aligns with the idea that the perceived usefulness of AI adoption in language learning/teaching is an insufficient condition for well-planned decisions. Goodwill, readiness, and a positive attitude may lead to total failure in the absence of adequate infrastructure and enabling conditions, which are crucial determinants of the success of any pedagogical decision.

The gap between rural and urban schools triggers thorough analysis and reconsideration. It reveals that without an equal redistribution of infrastructure, AI integration in language education will entrench existing regional inequalities. There is a risk of entrenching a two-tier system where urban schools are equipped and resourced with enough tools, while rural ones suffer from a lack or absence of basic infrastructure to integrate AI into classroom practices.

Alignment with Global Meta-Analytic Evidence

Although data analysis has shown that AI integration in EFL classes faces several challenges, the study's findings align with international meta-analytic literature. Participants are aware of the AI's effectiveness in enhancing learning owing to its ability to

provide personalized instruction and immediate feedback. However, it would be wrong to assume that AI integration is an easy process. It must cope with many challenges, such as infrastructural and institutional constraints, along with limited training.

The concern of learner over-reliance on AI tools is noteworthy insofar as it is consistent with Kundu and Bej's (2025) perception of learner autonomy being at risk, especially when they use AI tools as the main resource of language input instead of using them as a scaffold for skill learning and development. This indicates that AI integration in language education (EFL) settings should be central in teacher pre-service training and professional development initiatives.

Theoretical and Practical Implications: Towards a Pedagogy-First Framework

The findings of this study lead to a clear practical implication. AI integration in Moroccan EFL classrooms calls for a pedagogical framework that sets straightforward learning objectives instead of uncalculated decisions. Based on the findings, the study points toward four principal elements.

First, teacher professional development must be prioritized and repositioned as a prerequisite for AI adoption in education. It should not be regarded as a luxury to show the world that Moroccan EFL practitioners use AI in their teaching practices. Professional development initiatives should address the technical operation of AI tools and the pedagogical decision-making required for AI-appropriate integration in language education. These programs should draw on practice-based development models and be embedded in an authentic classroom context.

Second, infrastructure investment should be encouraged as a means of equity in education across the country. The rural-urban gap perpetuates regional inequality, one of the biggest challenges Moroccan educational authorities face. National AI integration policies without explicit regional equity will not lead to the desired outcomes. If AI integration becomes a standard by which Moroccan schools are assessed, rural schools will lag behind, and by extension, they will face injustice compared to urban schools, where teachers and students have the working conditions to integrate AI.

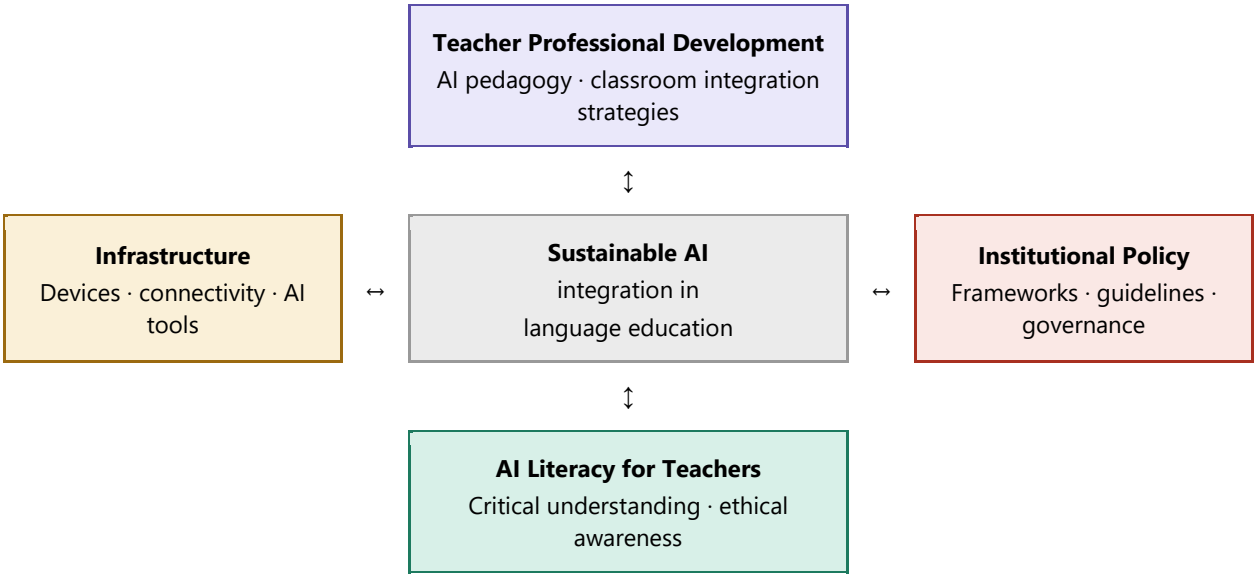
Third, the study strongly recommends that institutional policies and ethical guidelines must be developed and communicated to teachers throughout the country. Participants' reluctance about AI-assisted work assessment (52.6%) reflects a lack of a clear policy that can boost teachers' professional use of AI tools in language education. Teachers work within the institutional constraints/ structures that frame their work according to the official pedagogical guidelines.

Fourth, AI literacy, basically a critical understanding of AI's potential and limitations, should not be neglected. Even teachers who are highly enthusiastic about AI cannot ensure that learners engage with AI tools and know whether learning takes place or not. AI literacy is very related to teachers' professional development, especially those belonging to older generations.

These four recommendations are mutually reinforcing. Teacher professional development translates institutional policies into classroom practices. It can function well if teachers have a baseline of literacy to be able to implement national AI integration strategies and initiatives. This helps teachers adopt AI tools critically rather than blindly using these instruments. Without a clear policy, integration remains risky and dependent on individual teacher initiatives. Institutional policy sets parameters to select what tools are approved. All these recommendations call for adequate and appropriate infrastructure that is equally distributed throughout the entire country, because even the most literate and well-trained teachers cannot integrate AI tools without having access to devices and reliable connectivity.

Figure 2

Interrelated Recommendations for AI Integration in Language Education



Note. Arrows (↔ ↕) indicate mutual reinforcement between all four recommendations and the central goal of sustainable AI integration in language education. The four pillars are also laterally interdependent (reflecting the interconnected nature of sustainable AI integration).

Conclusion

The study has provided an overview of Moroccan EFL teachers' perceptions of AI integration in language teaching. The findings concluded that participants acknowledge the effectiveness of AI integration in language education, but it remains unrealized in actual classroom practice. This process faces several challenges, namely inadequate professional development, lack of infrastructure and its unequal distribution, and the absence of a coherent national institutional policy, as the urban-rural divide is clearly shown in the data.

The study findings support a pedagogy-first approach wherein AI tools define clear learning objectives with relevant teacher development, equitable infrastructure, and well-defined institutional governance. The study is an endeavor to contribute to an empirical foundation for the literature on AI integration in the Moroccan context, especially in EFL classroom practices. It offers practical recommendations to educational policymakers, as teachers and other stakeholders cannot act without a clear institutional policy that guides their actions/ decisions. Viewed through the TPACK framework, the findings indicate that the challenges associated with AI integration extend beyond access to technology. Effective implementation requires the development of interconnected technological, pedagogical, and content-related competencies.

However, this study faces many obstacles. The sample size was narrowed to one region and may not be fully representative of the national teacher population. The present study is the first step in a series of articles around the theme of AI adoption in the Moroccan EFL context. Further research will rely on more participants from other regions, engaging decision makers and students to provide a more comprehensive account of AI's impact on EFL learning/ teaching operations.

Funding: This research received no external funding.
Conflicts of Interest: The authors declare no conflict of interest.
Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

References

[1]. AlTwijri, L., & Alghizzi, T. M. (2024). Investigating the integration of AI in EFL classrooms: A systematic review. Heliyon, 10(10), e31053 https://doi.org/10.1016/j.heliyon.2024.e31053

[2]. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa.

[3]. Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2013). A review of technological pedagogical content knowledge. Educational Technology & Society, 16(2), 31–51.

[4]. Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Lawrence Erlbaum.

[5]. Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE.

[6]. Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. Field Methods, 18(1), 59–82. https://doi.org/10.1177/1525822X05279903.

[7]. Fricker, M. (2007). Epistemic injustice: Power and the ethics of knowing. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198237907.001.0001

[8]. Jeon, E.-Y. (2025). Artificial intelligence in ESL/EFL education: Evidence from recent reviews (2024–2025). International Journal of Learning, Teaching and Educational Research, 24(10), 509–526. https://doi.org/10.26803/ijlter.24.10.27.

[9]. Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. Medical Teacher, 42(8), 846–8 54. https://doi.org/10.1080/0142159x.2020.1755030

[10]. Kundu, A., & Bej, T. (2025). AI in school EFL learning: A systematic review of impact pathways for engagement, achievement, and satisfaction. Journal of Language and Education, 11(4), 131–148. https://doi.org/10.17323/jle.2025.21504

[11]. Ma, Y., & Chen, M. (2024). AI-empowered applications' effects on EFL learners' engagement and academic procrastination. BMC Psychology, 12, 739.

[12]. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

[13]. Koehler, M. J., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)? Journal of Education, 193(3), 13–19. https://doi.org/10.1177/002205741319300303

[14]. Robson, C., & McCartan, K. (2016). Real world research (4th ed.). Wiley.

[15]. Tashakkori, A., & Teddlie, C. (2010). SAGE handbook of mixed methods in social and behavioral research (2nd ed.). SAGE.

[16]. Tessier, S. (2012). From field notes, to transcripts, to tape recordings: Evolution or combination? International Journal of Qualitative Methods, 11(4), 446–460.

[17]. Torres, P. J., & Kahveci, Y. E. (2025). Effectiveness of artificial intelligence in language teaching: A meta-analysis. Computers and Education: Artificial Intelligence, 9, 100522. https://doi.org/10.1016/j.caeai.2025.100522

[18]. Wang, X. (2024). The effectiveness of artificial intelligence on English language learning achievement: A meta-analysis. System, 125, 103428. https://doi.org/10.1016/j.system.2024.103428