



## Readiness and Practice Gap in EFL: AI Integration in Moroccan High Schools

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DOI: <https://doi.org/10.36892/ijlls.v8i3.2628>

**APA Citation:** El Hamdaoui, S., & EDDOUADA, S. (2026). Readiness And Practice Gap In EFL: AI Integration In Moroccan High Schools. *International Journal of Language and Literary Studies*, 8(3), 135–154. <https://doi.org/10.36892/ijlls.v8i3.2628>

**Received:**

20/03/2026

**Accepted:**

29/04/2026

**Keywords:**

AI-assisted language learning; digital readiness; Moroccan secondary education; teacher professional development; academic integrity

**Abstract**

*Integrating artificial intelligence (AI) into English as a Foreign Language (EFL) teaching within low-resource public systems requires more than technological availability; it demands institutional infrastructure, teacher professional support, and learner readiness. This study examined the conditions enabling meaningful AI supplementation of English learning in Moroccan public high schools through parallel questionnaires administered in October 2025 to 20 secondary EFL teachers and 156 students in Larache. Data on digital access, attitudes, pedagogical knowledge, experienced constraints, and support needs were analysed using descriptive statistics, independent-samples t-tests, and thematic analysis of open-ended responses. Preliminary findings within the Larache context suggest a pronounced readiness–practice gap: near-universal smartphone ownership and broadly positive attitudes toward AI coexisted with inadequate school connectivity (only 15% of teachers reported reliable school internet), unclear academic integrity policies, large class sizes, and limited formal training (80% of teachers received no AI-specific professional development). Students demonstrated interest but inconsistent critical AI literacy. Bridging the gap requires coordinated investment in infrastructure, pedagogically grounded teacher development, and clear institutional policies on ethical AI use.*

### 1. INTRODUCTION

There has been a massive acceleration of global discussions about the role of artificial intelligence (AI) in education due to the emergence of very advanced models of artificial language such as (ChatGPT), attracting attention from educators, researchers and policy-makers alike (Yan et al., 2024). The potential benefits AI holds for English language educators are considerable, including opportunities to receive personalised feedback on written work through conversational agents, enhanced pronunciation skills using speech-recognition technology and enhanced vocabulary acquisition and reading comprehension through machine-translation tools. In the Global North, where schools have strong digital infrastructures and support systems for teachers, AI-integrated professional development and curricular development are being utilised increasingly throughout their respective educational systems (Holmes et al., 2019). However, while the possibilities presented by AI tools are attractive, fewer than three percent of Moroccan public high schools meet the technical requirements for

implementing AI. This lack of technical support creates a significant barrier for the implementation of AI in the educational setting for many urban centres in Morocco. Specifically, infrastructure constraints, limited teacher preparation, lack of protocols outlining acceptable usage of AI and uneven levels of readiness to use AI tools among students all contribute to the existence of what this study refers to as a readiness-practice gap, which exemplifies the disparity between educators' desire to utilise AI and the capacity of the educational community to build sustainable AI usage (van Dijk, 2020).

Larache is a coastal urban centre located in northwestern Morocco and was chosen as the study site due to the presence of many public high schools serving predominantly middle- and lower-income families. Urban areas in Morocco face many of the same challenges found in Larache, including large class sizes (often over 40 students), inadequate access to classroom technologies and unreliable internet connectivity. As English language proficiency is directly linked to an individual's ability to achieve economic mobility, the resource constraints experienced by English language educators remain a significant barrier to delivering quality instruction (Ali et al., 2023). Within this context, the public awareness of AI tools (i.e., ChatGPT, etc.) has evoked mixed feelings among educators and students, including excitement about using AI to improve learning and concern about fairness of access and academic integrity. To create appropriate equitable strategies for integrating AI into teaching and learning, an understanding of how 'ready'/able to use AI and how 'practice'/use of AI in teaching and learning/go to create value must be aligned (or misaligned) within the unique environments in which they are operating (Selwyn, 2019).

Research about the role of AI in teaching and learning has previously focused primarily on higher education institutions within developed/wealthy countries. As a result, little is known about how schools experiencing limited access to resources/classroom technologies in the Global South (Chaudhry & Kazim, 2021; Holmes et al., 2019) will use AI to support student learning.

There has been a little body of literature that identifies the current barriers to the development of 'digital readiness' in educational systems throughout Africa (Kozma & Wagner, 2005; Warschauer, 2003). However, there has been no published research that has examined AI within the context of the experiences of both teachers and students (simultaneously) within the same school system.

This study seeks to fill this knowledge gap by seeking to identify the conditions under which AI may be used to effectively support English language learning at resource-constrained public high schools. Specifically this study will address the following research questions: (a) to what extent do teachers' and students' access to the Internet on personal devices, access to the Internet on school-owned devices and access to the Internet at the school differ?, (b) how do the attitudes and self-efficacy perceptions of teachers and students differ?, (c) what pre-service preparation (for teachers) and professional development (for both teachers and students) do both groups have? and what are the most significant constraints preventing implementation? (d) to what extent will students demonstrate knowledge of AI literacy? (e) what supports will both groups believe are necessary to provide ethical/effective AI-supported language learning? The theoretical framework used for analysis of this study draws on three complementary theories. The Technological Pedagogical Content Knowledge (TPACK; Mishra & Koehler, 2006) framework represents the intersection of the three critical forms of knowledge (technological, pedagogical, content), illustrating that for there to be meaningful integration of AI into the classroom, educators need to be able to provide both AI tools and the technology-specific pedagogy that allows those tools to be used effectively in instruction (Mishra & Koehler, 2006). The Digital Divide Theory (van Dijk, 2020) goes beyond the limitations of basic access, skill level, usage, and results regarding connectivity; for example, though a smartphone may be used by the majority of the population, other factors are considerably larger sources of inequity. Examples of the larger sources of inequity include students' ability to connect to the Internet through school and teacher support, as well as their ability to manage

the activities and behaviours associated with using technology. Self-efficacy theory (Bandura, 1997) provides a psychological explanation for why an individual's level of competency in using technology can affect how a user performs. The psychological effects of limited access to school-based Internet connections, a lack of social support from friends or family, and fear of how others perceive them due to their use of technology lead to a decrease in a user's potential positive experiences with technology and therefore a decrease in their likelihood of adopting new technology, even when an individual has the desire to use new technology. The combination of Digital Divide Theory and Self-Efficacy Theory allows for the identification of why an individual's perception of being prepared to adopt new technology may not factor into how successful they will be; when new technology or other resources are made available and barriers exist to support their integration, it may lead to barriers to effectiveness (i.e., barriers that prevent a user from using technology effectively).

## **2. LITERATURE REVIEW**

### **2.1 AI in English Language Education: New Opportunities and Challenges**

The relationship between artificial intelligence (AI) and language learning has been discussed for over three decades. The use of technology in language learning began with the development of computer-assisted language learning (CALL) systems and continued through the development of intelligent tutoring systems and advanced artificial intelligence tools (Warschauer & Meskill, 2000). Generative AI will alter the way English as a Foreign Language (EFL) teachers think about their roles in the classroom and how students will interact with them. The use of generative AI will enable students to engage in written communication, receive instantaneous feedback on their grammatical correctness (e.g., spelling, punctuation), and have ongoing dialogue based on individual growth without the limitations of the 1:40 student-to-teacher ratios typically seen in traditional classroom settings. Generative AI has also made it possible for students to improve their pronunciation by using an interactive speech recognition system, and for adaptive platforms to create a sequential structure based on a student's individual rate of learning (Holmes et al., 2019). However, previous research has highlighted many potential challenges that may arise with the use of AI. In particular, researchers have raised concerns about the negative impacts of technological determinism, which assumes that technology will inherently create equal opportunities for everyone. Examples of negative technological determinism include (1) the inability of speech-recognition systems trained predominantly on first-language English speakers to recognise accurately the speech of second-language English speakers (Buolamwini & Gebu, 2018), and (2) the perpetuation of cultural stereotypes by language-models trained on datasets dominated by English-language sources (Noble, 2018). Use of digital tools inappropriately can hinder student learning when students develop dependence on translation tools without internalising the concepts (Bax, 2003; Selwyn, 2019). The integrity of assessment is further complicated by AI's ability to generate plausible responses (Perkins et al., 2024). In low-resource contexts where marginalised populations are served, these limitations are magnified. Teachers who were not adequately prepared could inadvertently facilitate surface-level learning, students who lack critical literacy skills could weaponise translation tools to commit plagiarism, and schools without established policies could find themselves facing legal action.

### **2.2 Digital Readiness: A Multi-dimensional Framework**

The concept of digital readiness is not simply about owning a device; rather, it is the confluence of four components: infrastructure, professional competence, institutional policies and learner dispositions necessary to leverage technology for effective teaching and learning (van Dijk, 2020). Across Africa, research has consistently revealed a combination of infrastructure deficits. In sub-Saharan Africa, less than 30% of schools have reliable access to electricity and internet (UNESCO, 2024). Morocco has done slightly better, as approximately 35% of urban schools are connected to the internet, but rural schools only have a small percentage of

connectivity (Tahiri et al., 2023). Besides establishing connectivity, schools must also maintain their equipment, provide technical support to users and use their tools for pedagogical purposes (Kozma & Wagner, 2005).

Professional readiness is the second element of digital readiness; i.e., the knowledge, skills, and confidence of teachers who use technology. Studies conducted across the African continent show that between 60% and 80% of teachers have received no training in digital competence; instead, most derive their skills from informal learning with peers (Darling-Hammond et al., 2009; OECD, 2025). While the fact that informal learning provides resilience, it typically results in narrow skillsets for operating only specific tools, without a broader understanding of pedagogy or ethics.

#### Learner Readiness

Additional factors affecting learner readiness include varying levels of smartphone penetration, varying quality of smartphones and internet access, and the fact that digital experience does not necessarily correlate with the ability to evaluate digital content critically (e.g. examine the source of the information, identify possible biases in the content, and use digital tools safely and responsibly) (Selwyn, 2019). The relationship between English proficiency and technology use also creates different layers of complexity in the adoption of technology in EFL settings.

Institutional readiness is comprised of the policy framework in place for supporting the adoption of new technologies at schools (policy development as at school level or through state mandate) and the types of resources (physical, financial, and human) allocated to support the adoption of new technologies (Poniman & Irawan, 2025). Schools without established policies around academic integrity, data privacy, and acceptable use of technology leave both teachers and learners to navigate ethical dilemmas around technology on their own, leading to uncertainty and increased risk-taking. These factors should not be viewed in isolation or independently of one another: for example, unreliable internet connections in schools affect teachers' ability to experiment with AI applications which decrease teachers' self-efficacy towards trying new innovative teaching strategies using AI (Pedró et al., 2019).

### **2.3 Teacher Professional Development and Student Critical AI Literacy**

Successful integration of technology in the classroom requires teachers to have both the necessary technical skills and also a strong foundation in pedagogy in order to use technology to enhance the instructional process (Mishra & Koehler, 2006). Research literature has shown that much of the professional development opportunities available to teachers in resource-constrained environments focus mainly on how to operate the technology (Darling-Hammond et al., 2009, Guskey, 2002). Therefore, successful professional development should be sustained, collaborative and connected to the context in which the teachers work, as well as include the teachers' beliefs and values associated with using technology in the classroom in addition to providing the necessary skills. In addition, successful technology integration requires that the teacher incorporates the ethical and critical aspects of technology into their teaching (e.g. teaching their students to identify algorithmic bias, developing assessment activities that are resistant to plagiarism, collaboratively developing with students skills to critically evaluate AI outputs and aligning the teachers' technology usage with the goals of the lesson rather than just using the technology for technology's sake) (Chaudhry & Kazim, 2021, Holmes et al., 2019).

In educational settings, School administrators must provide adequate technical assistance as well as protected time for teachers to create a sustained use of technology; if this is not provided, then even the best development will have minimal impact on teachers' use of it (Theodorio, 2024).

The student perspective is also important when integrating AI meaningfully into learning environments. Students need to develop critical AI literacy skills, including how AI works, understanding the limitations of AI, evaluating the credibility of AI-generated outputs and contemplating the ethical implications of its use (Holmes et al., 2019; Selwyn, 2019). Research involving secondary-level students shows substantial variability in AI literacy, as some



students are developing critical AI literacy through self-directed learning, while others are developing dependency on AI, and/or using AI for unethical or deceptive purposes (Waltzer et al., 2023). In contextually appropriate English as a foreign language settings, students must navigate complex cognitive, ethical, and practical choices. Many students lack explicit curricular guidance, policy statements, and model behaviours from their teachers. Consequently, many students take an instrumental approach ("I am using AI to get the highest grade") as opposed to an educationally oriented approach towards learning. The academic pressure associated with assessments and the minimal supervision from teachers often allow for undue use of AI to escape detection (Sozon et al., 2024) and helps describe the current situation in most of Morocco's public schools.

The use of Generative AI has created new challenges for Academic Integrity. The output of a Generative AI system is not specific content taken from a source, yet is still not considered authentic work created by the student; thus, determining if the AI-generated output is authentic or not is difficult. Whether the use of AI constitutes a breach of Academic Integrity also depends upon the school's explicit policies regarding AI use (Selwyn, 2019). To address these changing realities, assessment design needs to evolve; for instance, assessments designed to measure process and reasoning skills, or assessments that require students to demonstrate a skill in-person will prove more resilient to Generative AI (Holmes et al., 2019); however, creating and utilizing these assessment types requires resources and institutional support, which are often lacking in resource constrained school settings. The Global South Perspective argues that fluently and evenly integrating AI into the Global South, without dedicated resources toward ensuring equitable practices, perpetuates existing inequalities in the Global South (Selwyn, 2019; Warschauer, 2003). The existing body of research emphasizes the need for TPACK development, equitable infrastructure, supportive institutional policies, and critical literacy of learners when considering how AI can be integrated meaningfully into K-12 learning environments; however, most studies focus on high resource contexts, with very few studies addressing dual teacher/student perspectives regarding the same school district and/or systems. Therefore, this study aims to fill the gap by providing multidimensional, localised evidence about the use of AI in the context of a low resource setting in Morocco.

### **3. METHODOLOGY**

#### **3.1 Research Design**

A concurrent mixed-method research design was employed in this study (Creswell and Plano-Clark, 2017). Utilising a concurrent mixed method approach, the researcher used quantitative (questionnaire) responses and qualitative (open-ended) data to examine readiness-practice gaps; this allowed the researcher to determine both the extent and implications of the lack of access to technology for K-12 educators. Quantitatively, 85% of teachers indicated that they do not have sufficient technology (equipment) available to them, while qualitatively, the open-ended data provided insight into the ways in which teachers perceive the lack of technology and are required to make pedagogical sacrifices because of it. The study adopted a cross-sectional design and was conducted using a single data collection point (October 2025); this allowed the researcher to use a comparative approach to compare the similarities and differences between the teachers' and students' perspectives on a shared phenomenon.

#### **3.2 Participants**

Twenty teachers (including both males and females) teaching English full-time at public high schools in Larache, Morocco during the 2024-2025 academic year were sampled for this study. Their years of experience as teachers varied, with 15% of participants having 2 to 5 years, 30% having more than ten years, and 55% having between 6 and 10 years of experience. The gender distribution was 50% male and 50% female, and most teachers were aged between 30-39 (70%). The sample consisted of 156 students enrolled in the 1st and 2nd year of education and attending 5 public secondary schools in Larache, Morocco. These students represented a

predominantly female population (63%) as is consistent with the larger pattern for secondary completion in Morocco. The ages of the students varied between 14-20 years with the largest age group being 16-17 years (62%). Students were recruited purposively by being directly contacted by school administrators. The response rate was approximately 95% (179 administrators, 156 respondents). Students had to be either full-time employed or enrolled in Larache public secondary schools where English was the primary teaching or learning language. Parental consent was received for those under 18; participants aged 18 or over were required to give consent to participate. Because of the purposive method of recruiting, the generalisability of the findings to a rural population (where schools may experience considerably higher constraint occurrences) is limited. This limitation has been noted in previous studies.

### **3.3 Instruments and Procedures**

A structured questionnaire consisting of 45 items was administered to teachers and a comparable questionnaire consisting of 40 items was administered to students. Both questionnaires were divided into 5 sections with demographics; access to digital technologies; awareness and uses of AI; beliefs about personal efficacy; and what barriers exist and are needed to succeed in the use of AI. These items included both yes/no questions and 5-point Likert scales (1 = Strongly Disagree; 5 = Strongly Agree) as well as frequency scales and open-ended response options. In addition to the previously described items, the student questionnaire contained items related to academic integrity and evaluation of critical AI literacy. A procedure was used to develop items that measured aspects of digital readiness (Ferrari, 2012), technology adoption (Davis, 1989) and the TPACK (Mishra & Koehler, 2006) framework. Following this development process, the items were reviewed by three experts external to the study. They were then pilot tested with five teachers and twelve students who were not included in the final sample. All constructs measured with more than one item had Cronbach's alpha values greater than .70 (teacher attitudes,  $\alpha = .82$ ; teacher self-efficacy,  $\alpha = .79$ ; student attitudes,  $\alpha = .81$ ; and student integrity concerns,  $\alpha = .77$ ). Questionnaires were also translated into Arabic, French, and English to meet the linguistic preferences of participants.

The data collection was conducted in the regular school schedule in October 2025 after written consent from participants and school administration had been obtained. The completion of the questionnaires took approximately 20-30 minutes. Research team members were available to provide clarification as participants completed the questionnaires in person. Completed questionnaires were assigned numerical codes to maintain anonymity and were stored in a password-protected database.

### **3.4 Quantitative Data Analysis and Ethical Considerations**

Quantitative data were analysed using SPSS Version 27. Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated for all items. Chi-square testing was used for comparisons of categorical variables and independent-samples t-tests for comparisons of continuous variables ( $p < 0.05$ , two-tailed). Cohen's d was reported as effect size (Cohen, 1988) and interpreted using the accepted reference ranges of small ( $d = 0.2$ ), medium ( $d = 0.5$ ), and large ( $d = 0.8$ ). Equal variances were assumed unless otherwise noted; thus, Levene's test was checked prior to conducting any t-tests. Qualitative data were analysed using thematic analysis (Braun & Clarke, 2006); two members of the research team independently coded 30% of the qualitative data to generate an inductive codebook; one team member then used the inductive codebook to code the entire qualitative dataset with 20% double-coded for inter-rater reliability (Cohen's  $\kappa = .83$ ). Themes were generated by grouping together codes (e.g., "Structural Barriers" combining codes related to equipment, internet, class size, and time) and integrated with quantitative findings during the interpretation process using triangulation. Ethical approval to conduct this study was obtained from an Institutional Review

Board. Participation was voluntary and responses were anonymous; participants were assured that their honest responses would not impact their employment or grades.

#### 4. RESULTS AND DISCUSSION

This section presents findings and discusses them in relation to prior literature and the readiness–practice framework, organised around the five research questions: device access and infrastructure (4.1–4.2), awareness and usage patterns (4.3), attitudes and self-efficacy (4.4), pedagogical knowledge and constraints (4.5), student critical AI literacy (4.6), and identified support needs (4.7). A synthesised integration closes the section (4.8).

##### 4.1 Device Access and Participant Demographics

Table 1 presents device ownership for both groups. All 20 teachers (100%) report owning a smartphone, and 18 (90%) also own a laptop or desktop computer. Among students, smartphone ownership is near-universal (153/156; 98%), yet personal computer or laptop ownership is markedly lower, with only 39 students (25%) reporting access to such a device. This 65-percentage-point gap in higher-capability device ownership is consequential: activities requiring sustained text generation, prompt refinement, or document editing — functions central to meaningful AI-assisted language learning — are substantially more demanding on smartphones than on computers. The device-ownership asymmetry constitutes a foundational structural constraint that pervades subsequent findings. This pattern aligns with digital-divide theory's distinction between access and meaningful use (van Dijk, 2020): widespread smartphone adoption masks sharper inequalities in the equipment best suited to sustained AI-assisted academic work.

**Table 1**

*Participant Device Ownership: Teachers (n = 20) and Students (n = 156)*

Characteristic	Teachers n	Teachers %	Students n	Students %
Smartphone	20	100	153	98.1
Laptop or desktop computer	18	90.0	39	25.0
Both smartphone and computer	18	90.0	39	25.0
Smartphone only	2	10.0	114	73.1
No device	0	0.0	3	1.9

*Note. Device ownership data were collected via self-report items. "Computer/laptop" refers to any personal desktop or laptop device. Percentages are calculated within each participant group.*

##### 4.2 School-Level Infrastructure and Connectivity

Device ownership alone does not determine AI accessibility; the quality and location of internet connectivity are equally decisive. Table 2 disaggregates connectivity by group, revealing layered inequalities. Among teachers, 19 (95%) report reliable home internet, while only 3 (15%) describe school internet as reliable; 12 (60%) characterise school connectivity as unreliable, and 5 (25%) report no school internet access at all. The contrast between home and institutional connectivity is stark: whereas the home environment is reasonably well-connected, the instructional environment — where pedagogical AI integration would

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necessarily occur — is deeply deficient. Seventeen teachers (85%) assess classroom technology as inadequate.

**Table 2**

*Home and School Internet Connectivity: Teachers (n = 20) and Students (n = 156)*

<b>Connectivity Variable</b>	<b>Teachers n</b>	<b>Teachers %</b>	<b>Students n</b>	<b>Students %</b>
<b><i>Home Internet Access</i></b>				
Reliable broadband/Wi-Fi	19	95.0	86	55.1
Intermittent/unreliable	1	5.0	44	28.2
Mobile data only	0	0.0	23	14.7
No internet access	0	0.0	2	1.3
<b><i>School Internet Access (teachers)</i></b>				
Reliable	3	15.0	—	—
Unreliable / frequently drops	12	60.0	—	—
No access at all	5	25.0	—	—
<b><i>Classroom Technology</i></b>				
Adequate equipment	3	15.0	—	—
Inadequate equipment	17	85.0	—	—
<b><i>Primary Internet Access Location (students)</i></b>				
At home	—	—	136	87.2
Cybercafé or commercial venue	—	—	13	8.3
At school	—	—	7	4.5

*Note.* "Reliable" denotes consistent broadband or Wi-Fi. "Intermittent" denotes connections described as frequently dropping or slow. School internet data were collected from teachers only.

Among students, 87 (55%) report reliable home internet, 44 (28%) experience intermittent access, 23 (15%) rely exclusively on mobile data, and 2 (1.3%) report no internet access. Regarding primary access location, 136 students (87%) access the internet at home, 13 (8%) at cybercafés, and only 7 (5%) at school. The concentration of student connectivity in domestic



rather than institutional settings means that most student AI use occurs unsupervised and outside the pedagogical frame — a pattern with clear implications for the academic integrity concerns documented in Section 4.6. This finding reinforces the primacy of infrastructure as the readiness–practice lynchpin: large class sizes (70% of teachers reported 36–45 students per class) interact with limited equipment to make individualised AI-assisted learning impossible, and unreliable school internet makes any online AI tool a gamble. As one teacher explained, "I can't build my lesson plan around a tool that might not work. So even though I know ChatGPT could help, I just don't use it in class." Meaningful AI integration cannot proceed without reliable school internet, classroom equipment, and technical support — prerequisites to any pedagogical intervention.

### 4.3 AI Awareness, Training, and Usage Patterns

Awareness of AI tools among both groups was high, yet formal training was conspicuously absent. Table 3 synthesises awareness, training receipt, and usage frequencies. Among teachers, 19 (95%) report familiarity with three or more AI tools and 16 (80%) have actively used at least one in teaching; however, only 4 (20%) have received any formal professional development in AI-enhanced pedagogy. Among students, 151 (97%) report awareness and 120 (77%) use AI occasionally for English learning; only 40 (26%) have received explicit AI instruction.

**Table 3**

*AI Tool Awareness, Training Receipt, and Usage Frequency: Teachers (n = 20) and Students (n = 156)*

Variable	Teachers n	Teachers %	Students n	Students %
<i>Awareness</i>				
Familiar with $\geq 3$ AI tools	19	95.0	151	96.8
Has actively used $\geq 1$ AI tool	16	80.0	120	76.9
<i>Formal Training/Instruction Received</i>				
None	16	80.0	116	74.4
Minimal (one workshop/course)	3	15.0	27	17.3
Some (a few sessions)	1	5.0	13	8.3
Substantial (multiple sessions)	0	0.0	0	0.0
<i>Frequency of AI Use in Teaching/Learning</i>				
Weekly or more	6	30.0	—	—
Occasionally (monthly or less)	8	40.0	—	—

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Rarely or never	6	30.0	—	—
Uses AI at least occasionally for English	—	—	120	76.9

*Note. "Familiar with  $\geq 3$  AI tools" indicates awareness of at least three distinct AI platforms. "Formal training received" refers to institutionally organised professional development (teachers) or explicit classroom instruction on AI use (students).*

Table 4 details teacher AI use by application category: lesson planning was most prevalent (14 teachers; 70%), followed by materials creation (13; 65%), activity design (11; 55%), and assessment-related tasks (8; 40%). The relatively lower uptake for assessment — the category most directly implicating integrity and critical evaluation — mirrors the pattern of insufficient training.

**Table 4**

*Teacher-Reported AI Usage by Application Category (n = 20)*

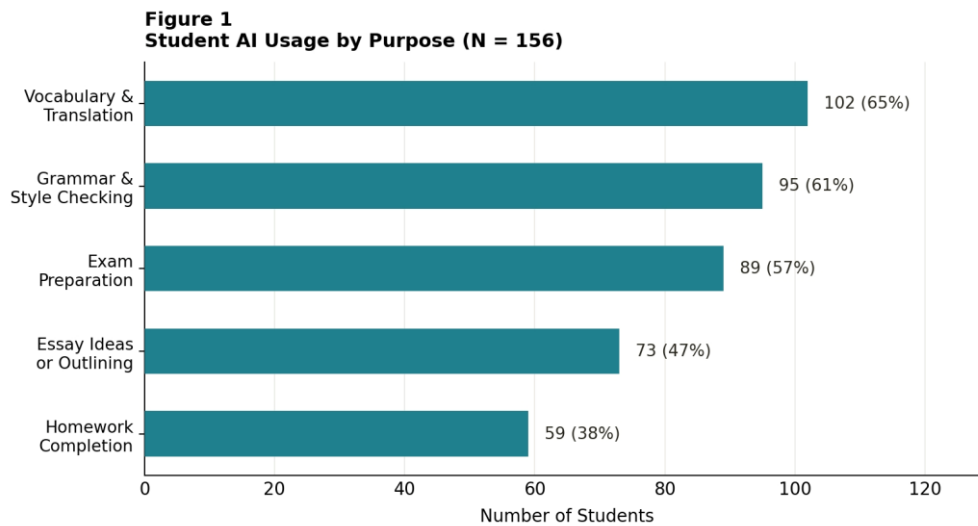
<b>Application Category</b>	<b>n</b>	<b>%</b>
Lesson planning	14	70.0
Creating teaching materials	13	65.0
Generating classroom activities	11	55.0
Assessing or providing feedback on student work	8	40.0

*Note. Participants could endorse multiple categories. Percentages calculated out of n = 20.*

As Figure 1 illustrates, student AI use was concentrated in vocabulary and translation (102 students; 65%), grammar and style assistance (95; 61%), exam preparation (89; 57%), generating essay ideas or outlines (73; 47%), and homework completion (59; 38%). The prominence of translation and grammar tasks reflects the instrumental, skill-acquisition orientation typical among beginner-to-intermediate EFL learners, while the non-trivial proportion engaging AI for homework or essay generation (38–47%) anticipates the integrity concerns in Section 4.6. The asymmetry between high awareness and negligible formal preparation characterises a self-directed, ad hoc adoption trajectory that carries inherent risks for pedagogical quality and integrity governance — consistent with evidence that informal digital skill acquisition, while resilient, rarely yields the pedagogical or ethical understanding required for principled integration (Darling-Hammond et al., 2009; OECD, 2025).

**Figure 1**

*Student AI Usage by Purpose (n = 156)*



Note. Multiple endorsements permitted; percentages calculated out of N = 156. Categories ordered by descending frequency. Data collected via forced-choice student questionnaire, October 2025, Larache public high schools.

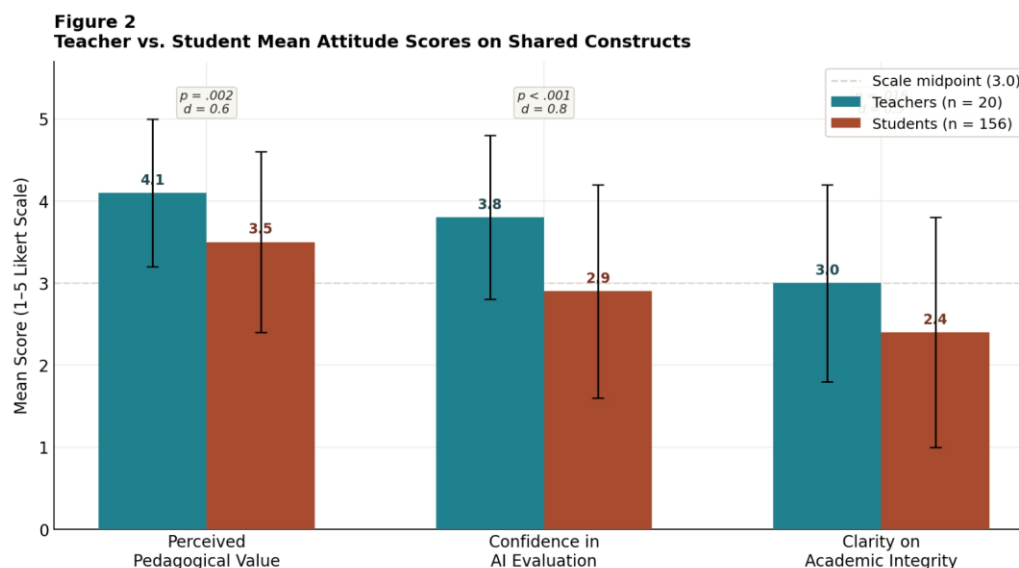
Note. Values represent the number of students (and corresponding percentage of total) who endorsed each use category. Multiple selections were permitted. Categories are ordered by descending frequency.

#### 4.4 Attitudes Toward AI Integration

Figure 2 presents mean Likert-scale attitude scores. Teachers report more favourable and confident attitudes than students, a pattern confirmed by the inferential analyses below. Among teachers, ratings were consistently above the scale midpoint for all items pertaining to AI's instructional potential. "AI can provide valuable feedback on student writing" achieves the highest mean ( $M = 4.2$ ,  $SD = 0.8$ ; 80% agreement); "AI can increase student engagement" ( $M = 4.1$ ,  $SD = 0.9$ ) and "AI can help differentiate instruction" ( $M = 4.0$ ,  $SD = 0.9$ ) were similarly well-regarded. Teachers express moderate-to-high confidence in their capacity to integrate AI ( $M = 3.8$ ,  $SD = 1.0$ ; 70% agreement). In contrast, "My school provides adequate support for AI integration" registers the lowest mean ( $M = 2.2$ ,  $SD = 1.3$ ; only 20% agreement) — a finding aligning with the infrastructure deficiencies documented above.

#### Figure 2

*Mean Attitude Scores on Key AI Integration Items: Teachers and Students Compared*



Note. Error bars represent  $\pm 1$  SD. Dashed line indicates scale midpoint (3.0). Statistical test results (independent-samples t-tests,  $df = 174$ ) are displayed above each construct pair. Effect sizes reported as Cohen's  $d$ .

Note. Responses were recorded on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Teacher and student items were parallel in construct but adapted in phrasing. Error bars represent  $\pm 1$  SD. Teacher  $n = 20$ ; Student  $n = 156$ .

Student attitude scores were positive but measurably lower. "AI can help me learn English more effectively" ( $M = 3.6$ ,  $SD = 1.1$ ; 67% agreement) and "Using AI makes English learning more enjoyable" ( $M = 3.5$ ,  $SD = 1.2$ ; 63% agreement) exceeded the midpoint, yet the substantive minority (33% and 37%) expressing neutrality or disagreement indicates that student enthusiasm is not uniform. More critically, self-assessments of evaluative competence were markedly low: only 29% of students ( $M = 2.9$ ,  $SD = 1.3$ ) express confidence in evaluating the accuracy of AI-generated suggestions, and only 25% ( $M = 2.4$ ,  $SD = 1.4$ ) report clarity regarding what constitutes plagiarism in AI-assisted work.

Three independent-samples t-tests were conducted on matched construct pairs. On perceived pedagogical value, teachers ( $M = 4.1$ ,  $SD = 0.9$ ) rate significantly higher than students ( $M = 3.5$ ,  $SD = 1.1$ ),  $t(174) = 3.2$ ,  $p = .002$ ,  $d = 0.6$  — a medium effect indicating teachers perceive AI's value approximately half a standard deviation more positively. The difference in confidence in AI evaluation was larger: teachers ( $M = 3.8$ ,  $SD = 1.0$ ) are significantly more confident than students ( $M = 2.9$ ,  $SD = 1.3$ ),  $t(174) = 4.1$ ,  $p < .001$ ,  $d = 0.8$ . This large effect warrants close attention: students who cannot reliably identify errors in AI-generated text are ill-equipped to use such text as a scaffold rather than a crutch. Finally, clarity regarding academic integrity differs significantly,  $t(174) = 2.4$ ,  $p = .018$ ,  $d = 0.5$ ; teachers ( $M = 3.0$ ,  $SD = 1.2$ ) report marginally greater clarity than students ( $M = 2.4$ ,  $SD = 1.4$ ), yet the teacher mean itself barely exceeds the midpoint, indicating that clarity is inadequate across both groups. These patterns are consistent with self-efficacy theory (Bandura, 1997): the absence of mastery experiences, reinforced by unreliable infrastructure and absent social support, appears to erode the confidence on which sustained adoption depends.

#### 4.5 Pedagogical Knowledge and Experienced Constraints

Table 5 presents teacher-reported constraints. The two most prevalent structural barriers are lack of classroom equipment (17 teachers; 85%) and unclear academic integrity policy (16; 80%), followed by large class sizes — 36 to 45 students per class — (15; 75%), insufficient professional development (14; 70%), limited curriculum time (13; 65%), and students' uneven AI skills (13; 65%). Notably, 9 teachers (45%) acknowledge their own uncertainty about AI

pedagogy as a constraint — a degree of self-awareness that opens a leverage point for targeted capacity-building.

**Table 5**

*Teacher-Reported Constraints to Meaningful AI Integration (n = 20)*

<b>Constraint</b>	<b>n</b>	<b>%</b>
Lack of classroom equipment	17	85.0
Unclear academic integrity policy	16	80.0
Large class sizes (36–45 students)	15	75.0
Insufficient professional development	14	70.0
Limited curriculum time	13	65.0
Students' uneven AI skills	13	65.0
Own uncertainty about AI pedagogy	9	45.0
Administrative discouragement	4	20.0

*Note. Multiple endorsements permitted. Percentages calculated within the teacher sample (n = 20).*

Table 6 presents parallel data from students. The most frequently reported barrier is limited access during school hours (135 students; 87%), followed by no personal computer or laptop (117; 75%), uncertainty about plagiarism (121; 78%), and absence of a clear school policy (109; 70%). A majority (87; 56%) report that teachers have never explained AI use to them, and 94 (60%) worry that AI use might harm genuine learning. Taken together, these barriers corroborate the teacher-reported institutional and pedagogical constraints, suggesting a mutually reinforcing cycle in which inadequate teacher preparation translates directly into inadequate student guidance.

**Table 6**

*Student-Reported Barriers to Effective AI Use for English Learning (n = 156)*

<b>Barrier</b>	<b>n</b>	<b>%</b>
Limited AI access during school hours	135	86.5
Uncertainty about plagiarism	121	77.6
No personal computer or laptop	117	75.0
No clear school policy on AI	109	69.9
Worry that AI harms learning	94	60.3



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Teacher has never explained AI use	87	55.8
Unreliable home internet	69	44.2
Lack of confidence using AI	52	33.3

*Note. Multiple endorsements permitted. Percentages calculated within the student sample (n = 156).*

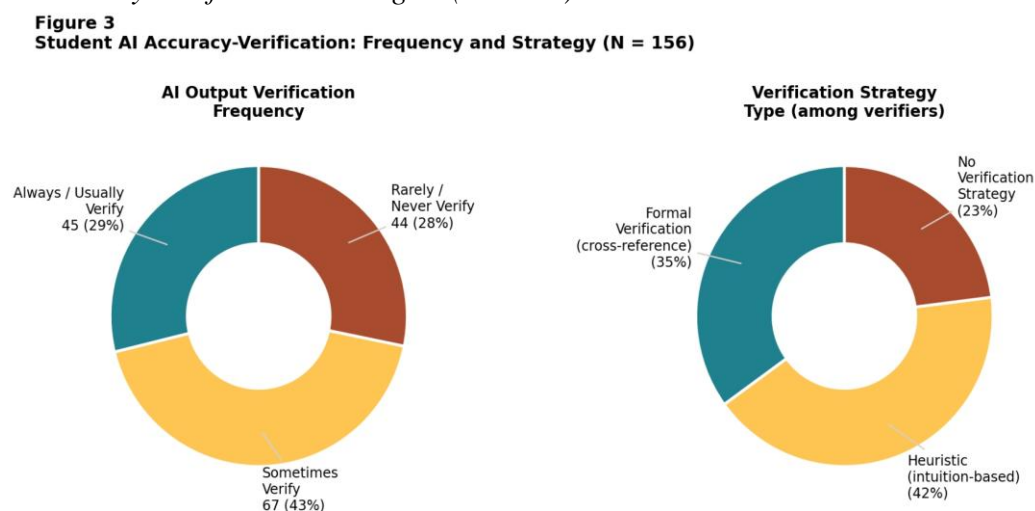
Qualitatively, teachers' explanations revealed a gap between tool awareness and pedagogical knowledge. Sixteen teachers (80%) have used AI tools, yet only five can articulate a clear pedagogical approach that integrated AI while preserving learning integrity; others defaulted to using AI for efficiency (lesson planning, materials creation) rather than for learning enhancement. Asked how they would design an assignment integrating AI, one teacher responded, "I could have students use ChatGPT to help them write essays"; pressed for details, the teacher struggled. A teacher who had engaged in sustained professional learning described a contrasting activity: "I would have students write an essay draft, then use ChatGPT to generate alternative ways of saying the same thing. They'd compare the AI's suggestions to their own draft and decide which is better. This way, they're practising revision and critical evaluation, not just getting an answer." The second approach exemplifies TPACK — a clear learning objective (revision, critical evaluation), AI use aligned to support that objective, and activity structure that keeps student thinking central. Addressing this knowledge gap requires professional development that is pedagogically focused, grounded in practice, TPACK-informed, and sustained over time (Darling-Hammond et al., 2009; Guskey, 2002) — not the one-off workshops typical of Moroccan in-service provision (CSEFRS, 2015).

### **4.6 Student Critical AI Literacy and Academic Integrity**

Figure 3 displays student accuracy-verification strategies. Only 45 students (29%) report routinely verifying AI-generated information against independent sources; the majority rely on surface heuristics (appearance of authority, plausibility) or do not verify at all. Figure 4 presents prompt-engineering behaviour: most students use simple, single-turn prompts and do not iterate or refine — a pattern suggesting passive rather than strategic tool use.

#### **Figure 3**

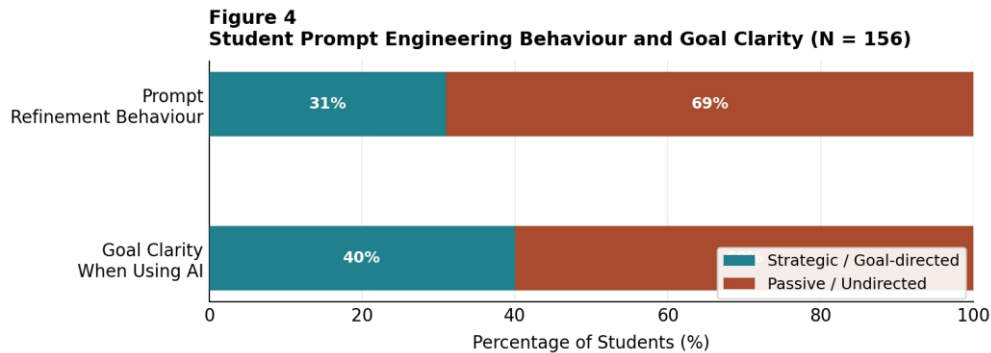
*Student Accuracy Verification Strategies (n = 156)*



Note. Left panel: all students (N = 156) — frequency of checking AI-generated content for accuracy. Right panel: percentage breakdown of verification strategy type. "Formal verification" = cross-referencing with authoritative sources. "Heuristic" = reliance on personal judgment. "No strategy" = AI output used without verification.

Note. Frequency with which students check the accuracy of AI-generated information against independent sources.

**Figure 4**  
Student Prompt Engineering Behaviour (n = 156)



Note. N = 156. "Strategic/Goal-directed" (teal) = students who reported clear learning goals (dimension 1) or who refine prompts based on initial AI output (dimension 2). "Passive/Undirected" (rust) = students who reported unclear goals or who adopt the first AI output without iterative revision.

Note. Distribution of student prompting strategies when using AI tools for English learning tasks.

Table 7 presents student responses to five academic integrity scenarios. Near-universal consensus is achieved for the clearest scenario: 91% of students correctly identify copying AI output directly as plagiarism. Agreement is high for using AI to brainstorm only while writing in one's own words (87% acceptable) and using AI to generate an outline while writing independently (82% acceptable). However, 30% classify using AI for translation-to-understand as plagiarism — a misconception that could deter legitimate pedagogical use — and, most notably, 48% consider undisclosed use of AI for source-finding as acceptable, indicating weak understanding of citation and transparency norms. The scenario-level variance underscores that student integrity literacy is neither uniformly absent nor uniformly developed: misconceptions cluster around disclosure obligations and intermediate use cases, precisely where institutional policy is most needed.

**Table 7**  
Student Responses to Academic Integrity Scenarios (n = 156)

Scenario	Not acceptable n	Not acceptable %	Acceptable n	Acceptable %
1. Copying AI output directly into an essay (unmodified)	142	91.0	14	9.0
2. Using AI to brainstorm ideas, then writing in own words	21	13.5	135	86.5
3. Using AI to generate an outline, then writing independently	28	17.9	128	82.1

4. Using AI to translate for comprehension, then discussing	47	30.1	109	69.9
5. Using AI to find sources without disclosing assistance	81	51.9	75	48.1

*Note. Students classified each scenario as "plagiarism/not acceptable" or "acceptable." Percentages are row percentages within each scenario. Data reflect integrity literacy rather than actual behaviour.*

Only 31 students (20%) report having received a teacher explanation of “what counts” as acceptable use of AI, leaving many likely “guessing” how to use AI for help. In this policy vacuum, teachers may steer clear of AI altogether, enforcing an inconsistent standard which leaves students using AI but worrying it will be a violation of the integrity policy, repeating the pattern documented elsewhere where it is “policy ambiguity,” rather than “individual deficiency,” which drives risky practice with AI (Perkins et al., 2024; Sozon et al., 2024; Waltzer et al., 2023). To alleviate this, institutional policies should provide clarity on acceptable use—a detail often absent in myriad guidelines released thus far—for “class/homework use, accessibility, research, and exams;” specify whether and how students should attribute assistance; make a clear distinction between legitimate learning support and dishonest shortcuts; include specific use cases to guide the spirit of the policy and next steps for compliance; and outline enforcement and a periodic review process that will allow the institution to keep pace with rapidly evolving tools.

#### **4.7 Identified Support Needs**

Table 8 presents the synthesised support-needs framework. Among teachers, professional development is the most urgently expressed need (18; 90%), followed by improved classroom infrastructure (17; 85%) and policy clarity on academic integrity (16; 80%); protected time for experimentation (14; 70%) and collaborative professional learning communities (12; 60%) follow. The convergence of PD, infrastructure, and policy as top priorities maps directly onto the top three constraints in Table 5, confirming internal consistency and indicating that teachers themselves possess an accurate diagnosis of their barriers.

**Table 8**

*Synthesised Support Needs Framework: Teachers (n = 20) and Students (n = 156)*

Category	Teacher item	T n	T %	Student item	S n	S %
PD / guidance	Pedagogically focused AI PD	18	90.0	Teacher guidance on AI use	132	84.6
Infrastructure	Improved infrastructure	17	85.0	Improved technical access	98	62.8
Policy	Clear integrity policy	16	80.0	Clear school policy	109	69.9
Time & space	Protected PD time	14	70.0	Protected in-class practice time	—	—

Community	Peer communities of practice	12	60.0	Peer learning channels	44	28.2
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*Note. Support needs were assessed via separate closed-ended items inviting each group to identify which forms of institutional or pedagogical support they considered most important. Multiple selections were permitted.*

Student support needs centred on a different priority: 132 students (85%) nominate teacher guidance on how to use AI appropriately as their primary need — positioning the teacher as the principal agent of change in the student's experience, a finding with important implications for professional development design. Clear institutional policy is endorsed by 109 students (70%), improved technical access by 98 (63%), and peer learning opportunities by 44 (28%).

#### 4.8 Integrated Synthesis: The Gap Between Readiness and Practice

Within the Larache context, preliminary qualitative and quantitative findings converge on a common pattern: very aware of AI but poorly trained (25% of teachers trained, 20% of teachers trained; 26% trained). This suggests that adoption is driven by individual initiative, rather than driven by institutional planning. To compound this gap between what is needed, and where we start, only 15% of teachers have functioning school access to the internet, only 5% of students have access to AI at school, only 25% of students have a computer, 80% of teachers and 70% of students are unaware of what current AI policies exist, and 50% of students think AI is not allowed in school, i.e., the need for a system-level, not individual-level, response. Although teachers are more confident than their students, neither group is prepared for principled integration (only 25% of teachers feel prepared to teach academic integrity and only 5 of 20 are able to clearly describe AI based assignments), and prompt- engineering data suggest largely passive use of AI by students, there is qualitative evidence of an existing, perhaps more critical subpopulation of students whose potential can be developed through explicit AI literacy training.

Central to the data is a tension between teachers' positive beliefs about AI and weak operational readiness. Practitioners view AI favourably as an instructional resource, yet limited training, lack of institutional clarity, and fragile school infrastructure lead to a hesitant and inconsistent classroom approach. This gap between “readiness” (beliefs and willingness) and practice (actual use) points to the need for coordinated investments in pedagogically grounded in service training for teachers focused on AI and academic integrity, clear context-sensitive institutional AI policy, and robust school-based digital infrastructure. Addressing one of these dimensions alone is insufficient: infrastructure without pedagogy, knowledge without application, and policy without support will not produce meaningful change. From an equity perspective, ad hoc, individually driven AI adoption carries the dangers of widening socioeconomic gaps. Some students with better resources, where access to technology is feasible and home engagement is supported, will likely benefit more from AI tools, while one's peers with insufficient support at home and school fall irretrievably behind one's affluent peers. When a system yet to be effectively reached combines infrastructure, universal professional development and training, and clear policy, AI holds potential for more equitable access to quality English learning at scale in large classes. Without intentional prioritisation of under-resourced schools, technology will simply reproduce existing inequalities (Selwyn, 2019; Warschauer, 2003).

There are limitations in this study. Findings from urban Larache public schools may have limited generalizability in other contexts, such as rural or private schools. Furthermore, while the cross-sectional design provided a snapshot of the data collection, longitudinal studies would provide more complete data and would allow for greater exploration of the sustained and deepening effects of practice on professional learning in the future. Additionally, self-report data would be further enhanced by data from classroom observations, as the results are based solely on teachers' and students' reporting. Furthermore, this research did not measure the outcomes of AI supported instruction and future studies should assess whether AI supported

instruction leads to increases in proficiency, retention, or critical literacy skills compared to traditional methods of instruction.

## **5. CONCLUSION**

This exploratory study explored readiness conditions for meaningful AI use in classroom settings in Larache public high schools and the correspondence of teachers' and students' readiness and actual classroom use. Both teachers and students intend to leverage AI tools for learning purposes, but perceive institutional and infrastructural barriers to meaningfully use AI in the classroom. Personal access to devices amongst students is perceived as widespread in Larache, though the infrastructure of the schools is viewed as inferior to their access to devices. Thus, while both students and teachers demonstrated a general positive attitude towards the use of AI, neither has significant pedagogical knowledge of the use of AI. Teachers demonstrate initiative by adopting AI in their classrooms independent of any guidance, and consequently there is some issue of students' appropriation and ethics.

The gap between teachers' and students' readiness and their actual levels of AI use in the classroom mirrors other gaps in the Global South, particularly in resource-poor countries, between the enthusiasm for using technology to support and improve learning and the constraints of the structural, institutional barriers. Furthermore, while there is evidence of students demonstrating personal initiative to use AI in the classroom, the absence of institutional support indicates a lack of readiness on the part of schools to support the effective use of AI in the classroom. However, this gap is not insurmountable. Strategic, intentional investment in infrastructure, pedagogically-based professional development for teachers, and development of clear institutional policies can enable Larache schools to convert the existing enthusiasm for engaging with AI by teachers and students into routine and meaningful engagement with AI in English language learning. These Larache-specific findings offer exploratory, context-bound insights that may inform future research across Morocco's diverse educational landscape.

## **6. FUTURE RESEARCH AND POLICY IMPLICATIONS**

Our findings provide preliminary, exploratory evidence from one city (Larache, Morocco). Further studies are warranted across the country in urban, rural, peri-urban and private-school contexts. None of the school facilities are the same, nor is the teachers' preparation, nor are the student demographics. Before this readiness–practice gap can be described as representative of Moroccan public high schools in general, more multi-site longitudinal work is to be undertaken, as discussed just above and elsewhere in this manuscript, particularly since a few novel ideas this study has put forward for how the gaps can be bridged.

Therefore, if wider, nationally representative studies confirm our suggestions, that evidence could be hugely influential. Moroccan education strategy might consider prioritising universal school network connectivity, scaling professional development for teachers through teaching pedagogical workshops and across regional centres, developing critically important AI literacy learning goals in the national curriculum, formalised equity allocation of funding and other resources to under-resourced schools. These trends should be understood as 'making suggestions based on current research to see if we're correct', rather than 'take our advice'.

Finally, future studies should employ a longitudinal design to further study how usage patterns evolve as ICT infrastructure and training improve; use classroom observations and analysis of artefacts to supplement self-report; investigate whether AI appropriate EFL instruction produces measurable gains in language proficiency, retention and/or critical literacy, and should compare urban and rural Moroccan schools to paint the full picture of the national AI readiness landscape. The cross-regional and comparative studies would produce the nationally representative evidence base needed in order to ground national education policy in the complex socio-educational landscape present in Morocco.



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