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Integrating AI into Instructional Materials Development: Moroccan High School EFL Teachers' Perceptions, Practices, Challenges, and Support Needs

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Abstract

This study aims to explore the perceptions, practices, challenges, and support needs of Moroccan high school EFL teachers regarding the integration of Artificial Intelligence (AI) in the development of instructional materials. To achieve the purpose of the study, a mixed-methods research design was adopted. Using an online questionnaire, the data were collected from 79 Moroccan high school EFL teachers. Cronbach's Alpha was used to measure the internal consistency between items in the questionnaire, and Pearson's correlation coefficient to analyse the relationship between teachers' perception, practices, and challenges, as well as the relationship between their demographic characteristics and their practices. The findings revealed that teachers hold positive perceptions of AI, but their actual use of AI remains selective and infrequent. Significant challenges, including a lack of training, insufficient institutional support, and ethical concerns, were found to constrain teachers' ability to act on their positive attitudes. The findings of the correlation analysis showed that there was a significant positive relationship between teachers' perceptions and practices, a significant negative relationship between practices and challenges, and a non-significant negative relationship between teachers' perceptions and challenges. Also, teachers' practices were positively associated with age, teaching experience, and prior AI training. The study informs EFL teachers and educational stakeholders in Morocco about the need for targeted professional development, improved digital infrastructure, and clear ethical guidelines to facilitate effective AI integration in developing instructional materials.

1. INTRODUCTION

Artificial intelligence (AI henceforth) has significantly influenced societies, organisations, and individuals (Dwivedi et al., 2023). Similarly, in the field of education, AI is increasingly being used to support traditional teaching (Luckin et al., 2016; Zawacki-Richter et al., 2019), resulting in a tremendous change thanks to the opportunities AI provides for both teachers and learners, especially in EFL classes wherein AI tools have the potential to revolutionise the way EFL teachers develop teaching materials, create activities and design tests and quizzes.

In this regard, the development of engaging teaching materials is a cornerstone of effective EFL instruction. In the last decade, AI tools have begun to revolutionise how such materials are conceived, produced, and adapted to learners' needs. Nowadays, AI-driven applications enable teachers to create reading passages, design grammar exercises, generate quizzes, adapt texts to different proficiency levels, and produce visually engaging worksheets. As Alshememry and Alshumaimeri (2023) maintain, "The use of AI has permeated the educational system… from developing tailored study materials … to creating and grading customized assessments" (p. 654)

In Morocco, the digitalization of education has been central to recent reform efforts, yet the practical integration of AI into everyday EFL instruction is still at its embryonic stage, particularly in teaching material development. According to Hajji (2023), several Moroccan educators and curriculum designers are still unaware of the benefits of these technologies. In the same context, at the level of policy making, he notes that Morocco's key education policies make no reference to AI as a modern educational tool or its potential contribution to development.

High school EFL teachers in Morocco face challenging professional environments where the need for creativity coexists with infrastructural and pedagogical limitations. While governmental initiatives have encouraged ICT integration in education, AI tools are often introduced with limited structured training or institutional support (Alrefaee et al, 2025; Mohammed,2023; Fakhar et al., 2024 & Ejjami, 2024). Therefore, it is essential to investigate how teachers perceive these tools and the extent to which they utilise them in material development.

1.1.Significance of the Study

The present study contributes to the emerging discourse on AI integration in foreign language education from a bottom-up and practitioner-oriented perspective by centring the voices of Moroccan high school EFL teachers. Moreover, the findings will provide insights for teachers, teacher training programs, curriculum designers, and educational policymakers seeking to promote the integration of AI for instructional innovation.

2. LITERATURE REVIEW

2.1. AI in Education

The field of education has undergone a digital transformation which started around the beginning of the third millennium. This change has deepened in the 21st century with the emergence of AI. In this respect, a growing body of research recognises AI as a field that has various applications in education, ranging from adaptive and personalised learning environments to intelligent tutoring systems, social robots for education, and immersive virtual

classrooms (Chen et al., 2022; Huang et al., 2021; Ouyang & Jiao, 2021; Tapalova & Zhiyenbayeva, 2022).

Various attempts have been made to guide this transformation safely. UNESCO (2024_a, 2024_b) has recently launched a framework that encourages both teachers and students to develop the necessary knowledge, skills, and values required to use AI responsibly (see Table 1). Moreover, it sheds light on the technical aspects of AI literacy as well as the ethical considerations. For teachers, the framework considers professional development in AI pedagogy as a critical component of future teaching practice.

Table 1. Competencies of AIEd (UNESCO, 2024a, p. 19, 2024b, p. 22).

Category	Student	Teacher
Human-centered mindset	Providing foundational AI knowledge and skills	Focusing on human agency, accountability, and social responsibility
Ethics of AI	Teaching responsible use and ethics-by-design	Promoting ethical use and principles
AI applications & techniques	Encouraging agency and social responsibility	Providing skills to create and use AI
AI system design	Fostering problem-solving and creativity	Supporting innovative teaching methods
AI pedagogy & development	_____	Enhancing lifelong professional development

The potential of AI in education has also been highlighted by the World Economic Forum (2024). Their Education 4.0 framework suggests that integrating AI into education presents an opportunity to: (1)streamline a broad set of administrative tasks for teachers, (2) help teachers in assessing learners more rapidly and enabling them to provide more immediate feedback (3) enable students and learners to develop digital literacy, critical thinking, problem-solving and creativity skills, and (4) personalise the learning experience, supported by teachers, leading to improved academic performance and better adaptation to diverse learning needs (World Economic Forum, 2024, p.9)

These potential benefits align with broader calls for rethinking the teacher's role, making them focus on focus on higher-order, relational, and creative aspects of learning while technology handles repetitive tasks. Furthermore, many countries have placed AI at the heart of educational practice (Tapalova & Zhiyenbayeva, 2022). However, access to technology alone is not enough to realise its full potential. Clear policies, adequate infrastructure, effective training, and ongoing evaluation are also needed to ensure that integration aligns with the educational goals.

Clearly, AI may help decrease the digital divide in the future AI world. Still, all the educational stakeholders are to be aware of how to utilise it responsibly, ethically, and inclusively (Božic´, 2023). Notwithstanding the previously mentioned benefits, various challenging issues are associated with integrating AI into education, including incompetent teachers, student experiences and inequity, ethical concerns, expenses, and infrastructure requirements (Kırtay, 2023).

2.2. AI in the Development of Teaching Materials

The integration of AI into instructional material development has emerged as one of the most practical applications of AI in language education. Bonner et al. (2023) suggested that AI has the potential to leverage its extensive knowledge of different subjects to help language teachers create new lesson ideas across diverse topics. Additionally, by seeing AI tools as teaching assistants with the ability to generate tailored content (Moorhouse, 2024), language teachers can better align their materials with their students' readiness, interests, needs, and profiles. More importantly, AI allows the implementation of differentiated instruction on a large scale, thus providing each learner with the exact support they need at any given time. As a result, teachers can focus more on teaching by reducing the time devoted to regular preparation. It should be noted, however, that the quality of AI-generated materials relies heavily on teachers' readiness to ensure that it is accurate, contextually appropriate, and aligned with curricular goals (Mouza et al., 2017).

Personalising the teaching materials is one of the most frequently discussed benefits of AI-assisted material development. AI enables teachers to adapt materials to students' competence levels and learning preferences by evaluating massive volumes of learner data (Kamalov et al., 2013). Moreover, AI tools, such as ChatGPT, can simplify reading passages, design vocabulary exercises with given word lists, or generate scaffolded writing prompts, create conversation practice, grammar lessons, and other resources (Moon et al., 2025). Additionally, image generation models can be used to create culturally relevant illustrations, while natural language processing tools can draft reading comprehension questions that reflect local contexts. For teachers, creating this kind of personalised content manually would be time-consuming, especially with large classes, as is the case with most Moroccan EFL classes.

Although AI has countless advantages in education, there are many challenges regarding its implementation. Privacy issues related to different educational actors' data have been raised by researchers (Fakhar et al., 2023). Thus, in order to ensure a fair and inclusive AI community and promote the well-being of individuals, employees should dedicate more time towards fostering AI education (Varsha, 2023). Therefore, professional development regarding AI integration into teaching will be essential to ensure that the technology serves as an enhancement to teachers' practice rather than a superficial time-saver.

2.3. Empirical Studies on the Use of AI in ELT in Morocco

Reflecting a broader global shift toward technology-enhanced learning, the Moroccan EFL context has not been safe from the invasion of AI. The latter is currently progressively incorporated into the Moroccan EFL context (Farhat & Ouchouid, 2025), offering possibilities for personalised learning, material development, autonomous learning, and assessment innovation. A large body of research in this area has provided insights into the pedagogical benefits of AI, teachers' perceptions and practices, and the challenges of integrating AI in ELT.

Several studies within the Moroccan context have focused on teachers' perceptions about AI and their readiness to incorporate it into their teaching practices. In this regard, Bekou et al. (2024), investigating teachers' perceptions and challenges regarding the use of ChatGPT, found that 43.5% of Moroccan educators agree on the usefulness of ChatGPT in ELT (p. 96). The study also revealed that teachers valued ChatGPT for its potential to "complement traditional classroom instruction, foster autonomous learning, and promote student engagement beyond the classroom" (p.97). However, concerns were raised about "academic integrity, factual inaccuracies, and overreliance on AI" (p. 104), leading the authors to recommend clear pedagogical guidelines for the ethical and effective use of AI (p. 105). Similarly, surveying 40

EFL teachers in Taourirt, Dahia (2024) reported that AI integration was generally viewed positively. Teachers demonstrated a strong appreciation for AI's ability to develop educational content and save preparation time. However, the author shed light on different concerns and limitations teachers associate with AI-generated content, such as accuracy, reliability, and the ethical use of AI-generated materials. Therefore, the author recommended that policymakers "take into account the development of robust training programs and ongoing professional development" (p.29).

This balance between opportunity and caution is reflected in Ejjami's (2024) policy-oriented analysis of Morocco's AI integration initiative, which aims to replace "traditional, one-size-fits-all educational approaches" with adaptive systems to address inequities (p.14). Ejjami noted, however, that such reforms depend heavily on "extensive digital infrastructure and teacher training" (p.14) alongside responsible governance of ethical AI usage. Similarly, Ezzaim et al. (2022) maintain that developing a solid technological infrastructure and investing in teacher training must be Morocco's top priorities to effectively leverage the power of AI in changing its educational system.

Several studies have provided further insight into demographic factors that influence AI integration. For instance, A survey conducted by Fakhar et al. (2022) demonstrated that gender, age, and teaching experience significantly affected teachers' AI knowledge, while only academic level influenced both knowledge and perception. Despite these disparities, respondents generally viewed AI positively, describing it as "useful in offering pedagogical materials as well as providing an ideal learning environment" (p. 862). For a better implementation of AI, the Authors recommended providing "continuous professional development programs where teachers will be introduced to AI and will be monitored to effectively using AI into their classrooms" (p.863).

In a related study framed by the Technology Acceptance Model (TAM), Allali and El Ghouati (2025) found that perceived ease of use (PEOU) correlated moderately with perceived usefulness (PU), and PU strongly predicted intention to use ChatGPT. Teachers reported intentions to use ChatGPT for designing tests and assignments as well as generating creative lesson plans. Moreover, the majority of teachers highlighted the necessity of technical training and institutional support.

Overall, the studies consistently reveal that Moroccan EFL teachers and students generally welcome AI for its efficiency, creativity, and adaptability. More importantly, they stressed that successful integration requires targeted training, clear ethical guidelines, and institutional and infrastructural support.

3. RESEARCH METHODOLOGY

3.1. Research Objectives

The present study has three main objectives:

RO1: Investigate Moroccan high school EFL teachers' perceptions of AI tools in the development of teaching materials.

RO2: Explore Moroccan high school EFL teachers' practices in using AI for material development.

RO3: Identify the challenges that teachers encounter and the types of support they need to integrate AI into EFL teaching effectively.

3.2. Research Questions

This study strives to answer the following research questions:

RQ1: What are Moroccan high school EFL teachers' perceptions of AI use in the development of teaching materials?

RQ2: What are Moroccan high school EFL teachers' practices when using AI to develop teaching materials?

RQ3: What challenges do Moroccan high school EFL teachers face, and what support do they need for the effective integration of AI in developing teaching materials?

3.3. Research Hypotheses

The research hypotheses emanating from the above research questions are:

RH1: Moroccan high school EFL teachers hold generally positive perceptions of the pedagogical value of AI tools in the development of teaching materials.

RH2: The extent of AI use in material development varies significantly according to teachers' demographics and professional characteristics.

RH3: Moroccan high school EFL teachers encounter different challenges when integrating AI in teaching, and they need training and support to use AI effectively in their teaching.

3.4. Research Design

The present study adopted a quantitative-dominant mixed methods design (QUAN + qual). The data was primarily gathered through a set of closed-ended questions, which provided quantitative measures of participants' demographic profiles, perceptions, reported practices, challenges and support needs. To complement the quantitative results, the questionnaire included a few open-ended questions that elicited participants' elaborations on their experiences, challenges, and support needs regarding AI integration in the development of teaching materials. According to Creswell & Plano Clark (2017), "the combination of quantitative and qualitative data provides a more complete understanding of the research problem than either approach by itself" (p.46).

3.5. Participants and sampling

The study involved 79 Moroccan high school EFL teachers. 64 of them were male (81.01%) and 15 were female (18.99%). Additionally, the majority of participants (44 teachers, 55.70%) were aged between 35–44 years, 25 teachers (31.65%) were aged between 25–34 years, and 4 teachers (5.06%) were in the 45–54 age range. Regarding academic qualifications, the majority of the participants (43.04%) held a Bachelor's degree, followed by those with a Master's degree (39.29%), and only 17.72% were PhD holders. Concerning teaching experience, the largest group (34.18%) was in the 05–10 years of teaching in EFL classrooms, followed by those with 11-15 years of teaching (26.58%), then those with more than 15 years of teaching experience (20.25%), while 18.99 % of them had less than 5 years of teaching. Surprisingly, the majority of the participants (93.7%) reported having no previous training on

the integration of AI in teaching. Table 2 illustrates the demographic characteristics of the participants.

The participants of this study were conveniently selected. In Convenience sampling, participants are chosen simply because they are willing and available to participate in the study for the sake of increasing the response rate (Creswell, 2008). Although convenience sampling limits the generalizability of the findings, the sample can provide useful data for answering the research questions (Creswell, 2008). The sample was drawn from professional networks, online teacher forums, and social media groups dedicated to Moroccan EFL teachers.

Table2. Sample Demographics Characteristics

		Frequency	Percentage %
Gender	Male	**64**	**81.0**
	Female	15	19.0
	Total	79	100.0
Age	under 25	2	2.5
	25-34	25	31.6
	35-44	**44**	**55.7**
	45-54	4	5.1
	55 and above	4	5.1
	Total	79	100.0
Years of Teaching	Less than 5	15	19.0
	5-10	**27**	**34.2**
	11-15	21	26.6
	More than 15	16	20.3
	Total	79	100.0
Academic Qualifications	Bachelor's degree	**34**	**43.0**
	Masters' degree	31	39.2
	Doctorate degree	14	17.7
	Total	79	100.0
AI training	Yes	5	6.3
	No	**74**	**93.7**
	Total	79	100.0

3.6. Data Collection and Analysis

For the data collection, the study employed an online questionnaire that contained both closed-ended and open-ended questions to elicit quantitative and qualitative insights simultaneously. 21 close-ended questions were structured using a five-point Likert scale and multiple-choice formats to picture the participants' demographic profiles and measure their perceptions, reported practices, and identified challenges regarding AI integration in EFL teaching materials development. Teachers' perceptions, challenges and support needs were elicited through a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree". The practices were explored using a five-point Likert scale that ranged from "Always" to "Never". Moreover, four open-ended questions allowed the participants to elaborate on their experiences, share examples of AI use, and suggest forms of the required support.

The instrument was piloted with 11 Moroccan high school EFL teachers. Based on their feedback, several adjustments were made. First, the practices section was restructured to

separate reading, grammar and vocabulary items. Second, overlapping items were combined to reduce the instrument's length. These changes strengthened the instrument's face and content validity, ensuring its suitability for the main study.

For data Analysis, the quantitative data were analysed using descriptive statistics (e.g., frequencies, percentages, and means) to gain insights into Moroccan high school EFL teachers' demographic characteristics, perceptions, and reported practices regarding AI integration in developing teaching materials. Moreover, inferential statistics were used to explore possible differences and relationships among variables. The qualitative data were approached using thematic analysis to identify patterns in teachers' reported challenges and perceived support needs.

In order to ensure the reliability of the questionnaire items used for each scale, Cronbach's Alpha was employed. The scales are reliable, as shown in Table 3. Cronbach's Alpha for teachers' perceptions, practices, and challenges regarding AI integration were .80, .96, and .70, respectively, which were all above the value deemed acceptable of .70 (Peterson, 1994). Therefore, the internal consistency of the measurement is observed to be strong.

Table 3: Reliability for the questionnaire elements

Element	Items	Cronbach's alpha
Perceptions	7	.80
Practices	8	.96
Challenges and support needs	5	.70

4. FINDINGS

4.1. Teachers' Perceptions regarding AI integration in material development

The findings presented in Table 4 provide insights into Moroccan high school EFL teachers' perceptions of AI integration in material development. Interestingly, with a mean of (M= 1.87), the vast majority of teachers (87.4%) agreed that AI can enhance the quality of teaching materials. This finding implies a strong appreciation of AI's pedagogical potential among teachers. Similarly, teachers almost achieved a consensus regarding the perception that AI tools save time in material development (91.1%, M= 1.73), which makes efficiency one of the most highly valued advantages of AI in material development. Additionally, 86.1% of the participating teachers stressed AI's ability to tailor materials to learners' levels and needs (M = 1.81), making AI useful for teachers adopting learner-centred approaches. With regard to teachers' professional motivation, a large majority (82.3%) affirmed that AI encourages innovation in their teaching practices (M = 2.04), which highlights the potential of AI to promote creative pedagogical practices.

However, according to the results illustrated in Table 4, a significant proportion of the participants (43%) expressed their uncertainty regarding the pedagogical soundness of AI-generated materials (M= 2.59). Similarly, 40.5% were uncertain about trusting AI tools to provide accurate and appropriate teaching materials, and 22.8% disagreed, resulting in the highest mean score (M = 2.76). Moreover, it was evident that teachers were concerned about over-reliance on AI in their teaching practices, with 68.3% of them acknowledging this risk (M = 2.20). In conclusion, although Moroccan high school EFL teachers held positive perceptions of AI-generated materials, they were cautious about the pedagogical reliability of such materials and the risk of over-reliance on AI, partially confirming the first hypothesis of the study.

Table 4: Teachers' perception of the Use of AI in material development

Perceptions	Strongly Agree %	Agree %	Uncertain %	Disagree %	Strongly Disagree %	Mean
I believe AI can enhance the quality of teaching materials.	38.0	49.4	5.1	2.5	5.1	1.87
AI-generated materials are pedagogically sound.	6.3	40.5	43.0	7.6	2.5	**2.59**
AI tools save time in material preparation.	40.5	50.6	6.3	00	2.5	1.73
AI can personalize materials to fit students' needs.	38.0	48.1	8.9	00	5.1	1.81
I trust AI tools to provide accurate and appropriate content.	12.7	24.1	40.5	20.3	2.5	**2.76**
Using AI motivates me to innovate in my teaching practices.	24.1	58.2	10.1	5.1	2.5	2.04
I am concerned about over-relying on AI for material development.	29.1	39.2	19.0	7.6	5.1	2.20

The qualitative data revealed that the majority of teachers expressed a cautiously positive view of AI use in the development of teaching materials. Several participants highlighted the usefulness of AI tools. For instance, Participant 1 declared that "*AI is useful when wisely used", Participant 5 pointed out* that "*AI is good as long as it is used methodologically"*, and Participant 35 stressed that "*AI is useful, but teachers should be careful about the information AI provides and cross-check it always*".Others emphasised its *potential for innovation* while simultaneously pointing out the need for caution, such as Participant 4, who expressed that *"it needs proper training and cautiousness"* and Participant 3, who stated that*"it can be very helpful, but the human touch is irreplaceable"*. However, a small number of teachers expressed a reluctance when dealing with AI in teaching, describing AI as *"not always reliable and accurate"* (Participant 2). By and large, similar to the quantitative findings, the qualitative results reveal that Moroccan high school EFL teachers generally recognise AI's pedagogical potential, but remain cautious about its accuracy and reliability.

4.2. Teachers' practices regarding AI integration in material development

Table 5 illustrates the descriptive statistics regarding the frequency of using AI tools in designing various types of teaching materials. By and large, most practices fall within the "rarely" category, which indicates that AI was not regularly incorporated into the participating teachers' teaching practices. Moreover, none of the practices were frequently implemented.

In light of the findings, the most frequently used practices were related to creating grammar exercises and designing quizzes or tests (M = 2.97, M = 2.92, respectively). However, the majority of them reported limited reliance on AI for generating reading texts or communication dialogues, adapting texts for learners' language proficiency levels, and generating lesson ideas (M = 3.29, M = 3.09, M = 3.15, respectively). These findings indicated that AI is occasionally used to support the development of teaching materials, but its adoption is not yet regular.

Surprisingly, the least frequent practices were linked to communicative and skills-based tasks. For instance, the mean for using AI in listening activities was the highest across all items (M = 3.73), indicating that teachers "rarely" rely on AI to support auditory learning. Likewise, the creation of speaking activities (M = 3.51, SD = 1.395) also falls within the "rarely" category. The same applies to designing visuals and worksheets using AI tools such as Canva (M = 3.34), which was also employed infrequently despite its perceived practicality.

The results above revealed that Moroccan EFL teachers tend to view AI as a supplementary rather than central tool in the development of teaching materials. Their practices

are characterised by selective engagement, leaning more towards tasks such as creating quizzes and grammar exercises, while showing marked reluctance to entrust AI with complex, communicative, and reading activities.

The results obtained from the qualitative data revealed that a large group of teachers highlighted concrete benefits of AI in their teaching practices. A recurring advantage of AI in teachers' responses was that it was time-saving and efficient. In this respect, Participant 3 stated that *"AI is time saving and offers more accuracy"* and Participant 4 noted that *"AI is time and effort saving as well as catering to students' needs"*. According to the results, the most frequent applications of AI in the participating teachers' practices involve *"generating content and designing lesson plans",* as noted by Participant 1 and Participant 35, as well as "designing tests", as declared by Participant 42. Others viewed AI as a creative partner. For instance, Participant 5 stated that "*I use AI to generate well-established ideas",* and Participant 33 noted that "*I always consider AI tools as a brainstorming machine that allows a starting point for teachers*". One teacher recognised AI primarily as a *"supporting tool, not a replacement",* which aligns with the relatively low reported use of AI for interactive tasks such as listening or speaking activities in the quantitative results. The qualitative findings suggested that even when usage is not frequent, teachers do perceive AI as a practical aid in reducing workload and inspiring new material.

Table 5: Teachers' practices of the Use of AI in teaching

Practices	Mean	SD	Frequency
I use AI tools to generate lesson ideas.	3.15	1.220	Rarely
I use AI tools to create reading texts or dialogues.	3.29	1.322	Rarely
I use AI tools for adapting texts to different proficiency levels.	3.09	1.351	Rarely
I use AI to design grammar exercises.	2.97	1.377	Sometimes
I use AI to design vocabulary exercises.	3.01	1.354	Rarely
I use AI to create listening activities.	3.73	1.258	Rarely
I use AI to create speaking activities.	3.51	1.395	Rarely
I use AI tools (e.g., Canva) for designing visuals/worksheets.	3.34	1.404	Rarely
I use AI to generate quizzes or tests.	2.92	1.366	Sometimes

Additionally, this variation in teachers' practices is further influenced by their demographic and professional characteristics. Table 6 displays the correlation results between teachers' practices and their demographic variables. The results revealed a positive correlation between teachers' use of AI in teaching material development and age (r = .301), teaching experience (r = .475), and prior AI training (r = .139), suggesting that older and more experienced teachers reported using AI more frequently than their younger or less experienced colleagues. It also indicates that teachers who have received some form of AI training tend to report slightly higher levels of AI use in their material development, aligning with teachers' strong reported need for training in both the survey and open-ended responses. On the other hand, the results showed that teachers' use of AI was negatively correlated with gender (r = –.231) and academic level (r = –.094). These findings demonstrated that male and female teachers interact with AI in different ways and emphasised that teachers' educational backgrounds did not significantly influence how they used AI in the classroom.

The findings above highlighted that background characteristics such as age, teaching experience and prior AI training are more closely associated with teachers' use of AI than gender, academic qualifications. This confirms the second hypothesis, which states that the extent of teachers' AI use is affected by their demographic characteristics.

Table 6: the relationship between teachers' practices and their demographics

		Practices	Gender	Age	Academic level	Teaching-experience	AI-training
Practices	Pearson Correlation	1	-.231*	.301**	-.094	.475**	.139
	Sig. (1-tailed)	-	.020	.004	.205	.000	.111
	N	79	79	79	79	79	79

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

4.3. Challenges and support needs regarding AI integration in teaching

Table 7 illustrates the findings related to the challenges Moroccan high school EFL teachers face when integrating AI into their teaching practices, as well as their support needs for an effective integration of AI into the development of teaching materials. In this respect, several challenges were highlighted by the participating teachers, confirming the third hypothesis of the study.

The most common challenge reported by teachers was the lack of training in how to use AI effectively. According to the results, 70.9% of the participants agreed with the statement "I lack training on how to use AI tools effectively", while only 10.1% disagreed. Therefore, the majority of teachers feel underprepared to integrate AI into their teaching practice, especially in the development of teaching materials. Similarly, the findings revealed that institutional support also appeared to be weak. In this regard, while only 10.1% of the participants agreed that their schools encourage AI integration, 35.5% of them disagreed, and 54.4% of them remained neutral.

Another common challenge was related to the ethical concerns of AI use. The majority of teachers (68.4%) either strongly agree or disagree with the statement "I'm concerned about the ethical implications of using AI", and 21.5% of them had a neutral opinion, indicating lack of clarity regarding the appropriate application of AI in the classroom.

Access to AI tools emerges as a moderate constraint, with 32.9% of the participants declaring that they face challenges in accessing AI tools, while a similar proportion (29.1%) didn't have such difficulties, and 30.4% remained neutral (M = 3.06). This result highlights different degrees of access to AI tools. Interestingly, the participating teachers demonstrated a strong willingness to engage in professional development. The majority of the participants (89.9%) showed readiness to attend AI-related training programs.

Table 7: Challenges and support needs regarding the use of AI in developing teaching material

Practices	Strongly Agree %	Agree %	Neutral %	Disagree %	Strongly Disagree %	Mean
I face challenges in accessing AI tools.	5.1	27.8	30.4	29.1	7.6	3.06
I lack training on how to use AI tools effectively.	11.4	59.5	19.0	10.1	00	2.28
I'm concerned about the ethical implications of using AI.	7.6	60.8	21.5	7.6	2.5	2.37
My school supports the integration of AI in teaching.	00	10.1	54.4	24.1	11.4	**3.37**
I would attend a professional development course on AI use.	59.5	30.4	7.6	2.5	00	**1.53**

The qualitative findings regarding the challenges that teachers encounter when integrating AI into their teaching practices emphasised three recurring issues, namely over-reliance, ethical concerns, and training needs. Concerning over-reliance, some teachers explicitly cautioned that *"teachers and learners would rely on it as a mainstream source of knowledge and information"*, as voiced by Participant 2, and Participant 46 warned against *"relying solely on it without caution". Accordingly,* Participant 33 stated that "*over-relying on AI tools might cause laziness; teachers cannot function and do their jobs without using AI tools"*. In addition to dependency issues, ethical concerns were also voiced by many participants. Interestingly, a minority expressed no particular concern (e.g., Participant 5), highlighting variability in teachers' readiness to engage with AI. These concerns were strongly echoed by the quantitative results, with a mean score of 2.20 for over-reliance and 2.37 for ethical concerns, reinforcing that teachers see these as significant barriers.

As for support needs and professional development, teachers articulated clear expectations for institutional and professional support, which resonates with the survey results wherein the overwhelming willingness (90% "agree/strongly agree", mean = 1.53) to attend AI training was the strongest result. Accordingly, the most frequent theme in the qualitative results was training. In this respect, Participant 1 suggested *"training teachers before integrating AI"* and Participant 4 recommended that *"if teachers are well trained, it can be effective"*. Beyond training, other teachers suggested curricular integration, calling for *"AI-related and integrated textbook tasks, activities, and projects"* (Participant 2) and *"AI to automatize repetitive tasks"* (Participant 3). Other teachers emphasised the role of institutional support and accessibility to AI tools. In this regard, Participant 11 recommended that AI be "*integrated officially into schools to help develop teaching level and study ideas", and Participant 33 suggested "giving teachers access to premium accounts instead of free ones".* These insights align with the strong survey-based agreement (90% "agree/strongly agree") that teachers would attend professional development on AI, as well as the widespread perception that schools currently provide insufficient support (mean = 3.37).

4.4. The relationship between Teachers' Perceptions and practices and challenges regarding AI integration in the development of teaching materials

Table 8 offers an account of the relationship between teachers' perceptions, practices and challenges of using AI in material development. In light of the results, there is a positive correlation between teachers' perceptions and their practices (r = .402), indicating that teachers who hold positive views of AI are more likely to incorporate it into the development of teaching materials. On the other hand, the results revealed a negative correlation between teachers' practices and challenges (r = –.314). This implies that the more challenges teachers report, the less they use AI tools in practice, and teachers who encounter fewer challenges tend to integrate AI into their teaching material development. Concerning the relationship between teachers' perceptions and challenges, the results revealed a negative but weak correlation (r = –.016), suggesting that the difficulties that teachers face in adopting AI (e.g., lack of training, ethical concerns, limited institutional support) do not necessarily alter their underlying beliefs about its potential value.

Table 8: Correlations between perceptions, practices and challenges

		Correlations		
		Perceptions	**Practices**	**Challenges**
Pearson Correlation	Perceptions	1.000	.402**	-.016
	Practices	.402**	1.000	-.314**
	Challenges	-.016	-.314**	1.000
Sig. (1-tailed)	Perceptions	-	.000	.444
	Practices	.000	-	.002
	Challenges	.444	.002	-

	Perceptions	79	79	79
N	Practices	79	79	79
	Challenges	79	79	79

5. DISCUSSION

As stated previously, this study strives to explore Moroccan high school EFL teachers' perceptions, practices, and challenges regarding the integration of AI into material development. The findings demonstrate that Moroccan EFL teachers generally hold positive perceptions of AI in material development, valuing its potential to enhance the quality of teaching materials, increase efficiency, and encourage innovation. This aligns closely with Dahia (2024), who found that "the majority of teachers had positive attitudes toward the use of AI-generated content" (p. 22), even as they remained cautious about accuracy. Similarly, Lehfid et al. (2025) observed that teachers viewed AI as a valuable partner in the classroom, stressing "a partnership in which artificial intelligence complements teachers' efforts and enhances the teaching and learning process" (p. 96). However, the findings of this study reveal worries among teachers regarding AI reliability, echoing Dahia's (2024) emphasis on the need for training and critical engagement when using AI-generated materials.

With regard to teachers' practice, the results demonstrate that Moroccan EFL teachers use AI selectively, relying on it primarily for structured tasks such as grammar exercises and quizzes, while rarely employing it for designing reading texts and communicative activities such as speaking or listening. This cautious and limited use mirrors Farhat and Ouchoui's (2025) findings, stressing that teachers need "assistance to improve their prompting skills" to move beyond surface-level use (p. 162). The present study confirms that Moroccan teachers recognise AI's efficiency and potential but have yet to integrate it into the more interactional dimensions of language learning. As such, AI appears to function more as a supplementary aid than as a central pedagogical instrument, echoing Ejjami's (2024) observation that integration requires "ongoing professional development and technical assistance" (p. 22).

Teachers in this study identified several recurring challenges related to the use of AI in teaching material development, including lack of training, weak institutional support, and ethical concerns. These challenges closely parallel those highlighted in the literature. Dahia (2024), for example, reported that teachers called for "workshops, presentations, and the integration of AI education within teachers' training centers" (p. 28), while Farhat and Ouchoui (2025) emphasised the necessity of "training in how to use AI bots for teaching and planning purposes" (p. 19). Ethical issues were also strongly reflected in both the current and previous studies, with Lehfid et al. (2025) already warning that ethical considerations are a major concern when it comes to AI in education. Moreover, consistent with El Ghazali and Benbrahim (2024), the present study emphasised weak institutional support as a major challenge that faces teachers. Accordingly, it is recommended that "investing in ongoing professional development and technical assistance is critical to equipping educators with the skills to use AI technologies properly" (Ejjami, 2024, p. 22). These findings indicate that while Moroccan teachers are not resistant to AI, their adoption is constrained by systemic limitations that inhibit confident and sustained use.

The correlation results of this study provide a deep understanding of the interplay between perceptions, practices, and challenges. A positive relationship was found between teachers' perceptions and their practices, implying that positive attitudes encourage greater AI use in the development of teaching materials. This is consistent with Allali and El Ghouati

(2025), who found that "there is a significantly positive and strong relationship between the teachers' perceptions and intention to use the chatbot (i.e., ChatGPT)" (p189). Conversely, practices were negatively correlated with challenges, illustrating that structural and ethical issues hinder teachers' ability to act on their positive perceptions. Interestingly, the lack of correlation between perceptions and challenges in this study suggests that teachers' optimism is robust even against obstacles. Clearly, these findings underscore that perceptions alone are insufficient. Only through training and infrastructural support can teachers' positive perceptions be translated into meaningful practice.

Interestingly, similar to **Fakhar et al.'s (2022) finding that age and teaching experience significantly affected teachers' AI knowledge**, the present study found that teachers' AI integration into material development is significantly affected by several demographic variables, including **age, teaching experience** and prior training on AI use, suggesting that older and more experienced teachers reported more frequent use of AI than their younger or less experienced colleagues. This is an interesting result, as it challenges the often-assumed "digital native" advantage of younger teachers. Instead, it indicates that veteran teachers, perhaps due to their established pedagogical repertoire and greater autonomy, are more likely to experiment with AI as a supportive tool. Moreover, the finding that prior AI training fosters higher levels is consistent with Farhat and Ouchoui' (2025) finding that teachers' effective use of ChatGPT depends heavily on assistance to improve their prompting skills.

6. CONCLUSIONS AND IMPLICATIONS

The present study has explored Moroccan high school EFL teachers' perceptions, practices, and challenges regarding the use of AI in the development of teaching material. According to the results, teachers held positive views about AI in teaching, but remain cautious about its reliability and pedagogical appropriateness. Their use of AI in developing teaching materials was selective and less frequent, mainly for grammar exercises and quizzes, but with little application to reading, listening and speaking activities. The variables of age, teaching experience and prior AI training shaped teachers' practices, while gender and academic qualifications had little influence. Constraints such as lack of training opportunities, insufficient institutional support, and concerns about ethical implications limited teachers' ability to act on their positive perceptions.

This study makes a significant contribution to the field of AI in language education in Morocco by providing empirical evidence from the high school context. The results demonstrate that positive teacher perceptions alone are insufficient to ensure meaningful integration of AI in materials development. The study illustrates that practices are constrained by structural and ethical challenges, particularly lack of training, limited institutional support, and concerns about accuracy and overreliance, which highlights the critical mediating role of the professional working environment. To bridge the gap between teachers' perceptions and practices, the study recommends targeted professional development that equips teachers with practical skills in prompt engineering, digital literacy and tool navigation, critical evaluation of AI-generated materials, and ethical use. Additionally, the study recommends that policymakers fund robust digital infrastructure, provide free or subsidised access to AI tools in schools, and incorporate AI pedagogy into teacher education programs.

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