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Digital and AI-Supported English Learning Needs among Secondary School Educators: Implications for Developing a Mixed-Audience MOOC

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Abstract

Artificial intelligence (AI) is transforming English language teaching (ELT) at a rapid pace but the professional development needs of current secondary school teachers are largely unknown. An explanatory sequential mixed-methods study surveyed 250 secondary school English teachers and interviewed 15 in an English-as-a-foreign-language (EFL) context in N'Djamena, Chad. While 95% of teachers use digital resources, the most used AI tools were Grammarly (72%) and Quizizz (68%) followed by ChatGPT (58%), mainly for lesson planning. Multiple regression analysis revealed that younger age ($\beta = -0.28$, $p < 0.001$) and previous technology-focused training ($\beta = 0.35$, $p < 0.001$) predicted more frequent AI use ($R^2 = 0.24$). Frequency of usage ($\beta = 0.41$, $p < 0.001$) and prior training ($\beta = 0.25$, $p < 0.001$) predicted perceived AI competency ($R^2 = 0.31$). Lower competence ($\beta = -0.38$, $p < 0.001$) and more positive attitudes toward AI ($\beta = 0.29$, $p < 0.001$) predicted greater interest in training focused on AI ($R^2 = 0.28$). The top training need identified by teachers was how to design AI-integrated classroom activities. Thematic analysis revealed four themes: cautious optimism, a "practicality gap" between understanding AI and its use in the classroom, time and training as critical limitations and a desire for a collaborative community. We propose a mixed-audience MOOC framework that incorporates a virtual community of practice, practical and contextualized tasks, a pedagogy-first approach, and a modular, tiered structure. This paper offers evidence-based recommendations for the design of AI-focused teacher professional development.

Keywords

Artificial Intelligence, English Language Teaching, Teacher Professional

Development, MOOC Design, Needs Analysis, Secondary Education

1. Introduction

The education sector is undergoing a major transition fueled by technological advancements, and in particular the emergence of generative Artificial Intelligence (GenAI) [1] [2]. Tools such as ChatGPT and other large language models (LLMs) are no longer niche technologies, but are increasingly being integrated into many aspects of modern life, including education [3] [4]. Such AI based systems open up unprecedented opportunities for the development of personalized, interactive and adaptive learning experiences based on English Language Teaching (ELT) [5]-[7]. AI tools can also help with different learning needs, such as providing immediate feedback on writing and assisting with conversation practice, which can increase student motivation [3] [8] [9].

But the successful integration of AI in secondary school classrooms is not guaranteed, as it relies on the preparedness and pedagogical skills of teachers [10]-[12]. While many teachers recognize the potential of these tools, they feel unprepared to deal with the complexities of AI-driven pedagogy, raising concerns around academic integrity, data privacy, algorithmic bias and the need to foster critical thinking in an age of automated content generation [1] [13] [14]. This creates an urgent need for high quality, accessible and relevant teacher professional development (TPD) [15] [16].

Massive Open Online Courses (MOOCs) have emerged as a scalable and flexible model of TPD that can reach a wide range of educators [17]. However, traditional MOOCs, which take a one-size-fits-all approach, often do not meet the different requirements, contexts and prior knowledge of a "mixed audience" of teachers, who may be very different in their online literacy and pedagogical approaches [18]. At the beginning, an in-depth needs analysis of the target audience must be conducted to formulate effective TPD [10] [11]. Much of the AI in education research is focused on developing new tools or post-hoc evaluations of specific interventions [5] [8]. There is a significant gap in the literature about the predesign phase, that is, a systematic study of secondary school English teachers' current practices, perceived competencies and learning needs about digital and AI-supported instruction.

The objective of this study is to address this gap by answering the following research questions: What are the current practices of secondary school English teachers in utilizing digital and AI-supported tools in teaching? What are the predictors (for example, demographics, prior training, attitudes) of frequency of use and perceived competence of AI among educators? What are the key professional development needs of these teachers to integrate AI into ELT? What does this imply for the design of a mixed-audience MOOC for TPD? A mixed-methods study is used to provide a complex understanding of the challenges and opportu-

nities for educators on the ground. The findings contribute to the design of a conceptual framework of a data-driven responsive MOOC for the various requirements of secondary school English teachers. At the end of the day, this research is part of a larger goal of helping educators integrate AI in a critical and effective way into their pedagogical practices, so that students' learning experiences are enhanced in an increasingly digital world.

2. Literature Review

2.1. The Evolution of AI in English Language Education

Technology in language teaching has evolved rapidly from the early Computer-Assisted Language Learning (CALL) programs that were focused on drill-and-practice activities to the advanced AI-driven platforms available today [19]. Today's ELT AI platforms utilize natural language processing and machine learning to deliver a host of capabilities. This encompasses generative AI tools like ChatGPT which can serve as writing assistants, conversational companions, and content creators [1] [20], intelligent tutoring systems providing personalized feedback [21], and adaptive learning platforms that adjust content difficulty based on student performance [6] [7].

Studies have found that there are many advantages of integrating AI in ELT. Research [7] [9] suggests that AI tools can improve students' motivation and engagement by making learning process fun and interesting. For example, there have been reports that collaborative learning supported by AI could enhance participation to English writing assignment [22]. Also, regular artificial intelligence can provide targeted help on specific language skills. Grammarly and Chatbot provide grammar and style criticism in real-time in writing, which helps students to improve their accuracy and fluency [1] [14]. AI is able to create pre-reading scaffolding questions to activate prior knowledge and support reading comprehension [23]. Students can practice talking to AI chatbots and tutors in a low-stakes conversational environment, which can build confidence and public speaking skills [8] [24].

2.2. Challenges and the Need for Teacher Professional Development

But there are problems to using AI despite the benefits. Teachers' readiness is a big problem. Many teachers lack the knowledge or confidence to successfully integrate AI tools into teaching [11] [14]. It is further complicated by practical issues such as poor infrastructure, time limitations, and varied online literacy levels among students and educators [25] [26]. Moreover, the difference of the available resources between urban and rural areas is a big barrier. The digital divide can amplify the inequity of education [15] [27].

The ethical issues are key also. There are several concerns regarding algorithm bias, data privacy and the possibility that AI will prevent students' critical thinking and creativity [28] [29]. Teachers worry that students who over-rely on AI tools

may lose their creativity and are more likely to cheat on schoolwork [1] [13] [30]. To tackle these issues, new skills are needed in addition to the technological knowledge, such as AI literacy, pedagogical knowledge for AI integration, and a strong ethical framework [12] [31].

So, an effective TPD is important. One-time workshops are often insufficient [32]. What we need instead are long-term, collaborative and practice-oriented paradigms. MOOCs are a feasible option to deliver TPD at scale, especially when designed to develop community and engagement [17]. However, the design of such MOOC should be based on a thorough understanding of the needs of the target audience moving beyond presumptions to a data-driven instructional design [10]. This study particularly focuses on this pre-design stage, and provides the empirical basis for the development of an effective and responsive TPD program for secondary school English teachers in the era of artificial intelligence.

3. Methods

3.1. Research Design

This study used a quantitative-dominant explanatory sequential mixed-methods design [25] [27]. This strategy was executed in two phases. In the first phase, a large-scale quantitative survey was conducted among secondary school English teachers to find general trends and relationships regarding the use and needs of AI-supported instruction. The second phase involved qualitative semi-structured interviews with a selected subset of participants from the survey to understand the quantitative results in more depth and to provide detailed and contextualized explanations for the trends that emerged. Figure 1 shows the sequence of the two phases and the points of their integration.

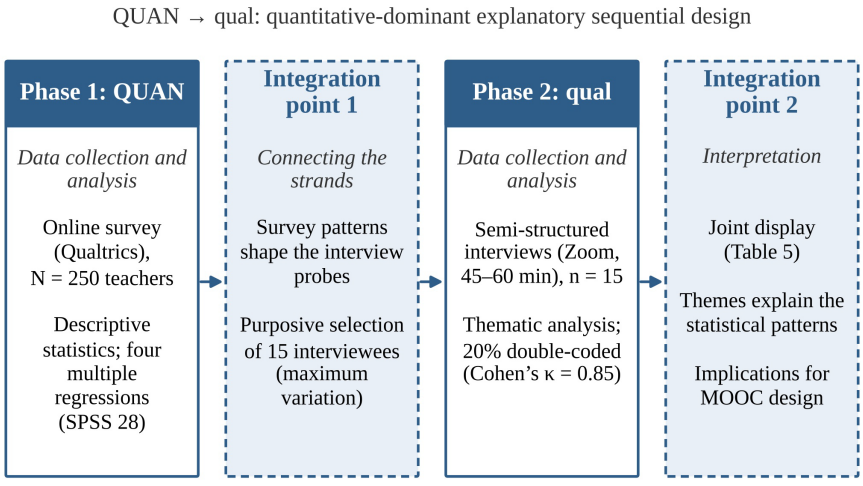


Figure 1. Explanatory sequential mixed-methods research design.

3.2. Participants

The participants were English language teachers working in public and private

secondary schools in the capital and largest city of Chad, N'Djamena, a large urban area with diversity of socioeconomic backgrounds. Schools are divided into the seven years following primary school: the three-year lycée (seconde-terminale) which ends with the baccalauréat, and the four-year collège (6e - 3e) which ends with the Brevet d'Enseignement Fondamental (BEF). French and Arabic are the official languages of Chad and its education system is based on parallel francophone and arabophone streams. Chadian Arabic is also employed as a lingua franca in N'Djamena, besides the other national languages used domestically. In collège and lycée English is taught as a foreign language, with all other subjects taught in French or Arabic. It is not an official language and is not used as a medium of instruction. English is thus a second language, which most students meet primarily in the classroom, after their mother tongue and either French or Arabic. So, the best way to describe the participants is as English as a Foreign Language (EFL) teachers in a multilingual, French-Arabic bilingual system. All secondary English teachers of the N'Djamena Provincial Delegation of National Education were invited by e-mail to participate. Of the 250 instructors, approximately 35% (n = 250) completed the online survey. The sample of respondents was diverse in terms of teaching experience: 28% had 1 - 5 years of experience, 45% had 6 - 15 years, and 27% had more than 15 years. 38% of the teachers surveyed worked in private schools and 62% worked in public schools. These characteristics are summarized in **Figure B1** (Appendix B). For the qualitative phase, 15 educators were purposefully selected from those who expressed interest in a follow-up interview. This selection aimed to maximize heterogeneity in terms of teaching experience, type of school (public/private) and self-reported levels of AI usage (low, medium and high) so as to represent a broad range of perspectives.

3.3. Instruments and Data Collection

3.3.1. Survey Questionnaire

A unique survey instrument was developed [12] [14] based on a review of relevant literature on AI and technology integration in education. The survey contained four elements: Demographics (age, gender, years of teaching experience, kind of school, and previous involvement with technology-focused TPD). Current Procedures: • List of digital/AI resources (ChatGPT, Grammarly, Quizlet, Google Bard, etc.) and Likert-scale questions (1 = Never, 5 = Daily) about how often they are used for various educational purposes (lesson planning, material creation, feedback, etc.) Perceived Competence and Attitudes: The use of 5-point Likert-scale items was used to assess educators' self-reported competence in using AI tools, beliefs about AI's role in education (e.g., "AI is a valuable assistant for teachers"), and concerns (e.g., "I am concerned about AI's impact on student creativity"). Professional Development Needs: Participants were asked to rank a list of potential TPD topics (e.g., "Basic prompt engineering", "Ethical use of AI", and "Designing AI-integrated projects") and their preferred format for TPD (e.g., MOOC, in-person workshop, webinar series). The online survey was administered via

Qualtrics and was available for 4 weeks.

The number of questions, example item wording, response possibilities, scoring and internal consistency of the regression models are presented in Table A1 (Appendix A). more frequent use of AI, more perceived skill, more positive attitudes, more interest in AI-focused TPD, and more perceived necessity of ethics training. Multi-item measures were scored as the mean of items. Internal consistency was assessed by Cronbach's α (Table A1). The items were based on the above-mentioned literature and checked by three experts in educational technology and English language teaching. A pilot study was conducted with ten instructors who did not participate in the main study. The chosen TPD format was captured as a single categorical choice (MOOC, in-person workshop or webinar series) and described.

3.3.2. Semi-Structured Interviews

A process of interviews was created to further investigate the key themes that emerged from the survey. The questions were open-ended, allowing participants to provide specific experiences and perspectives. One of the probes was: "Walk me through an instance in which you've used an AI tool in your teaching." "What are the biggest challenges you face in trying to use new technologies?" and "If you were to design an AI training course for your colleagues, what would be the most important thing to include?" The interviews lasted 45 - 60 minutes, were conducted via Zoom, audio recorded and transcribed by an expert.

3.4. Data Analysis

Quantitative data from the survey were analyzed with SPSS version 28. Descriptive statistics were calculated (frequencies, means, and standard deviations) to provide an overview of current procedures and requirements. To answer the second research question, four multiple linear regression analysis were conducted to find predictors of important outcome variables. Each outcome was a mean score of multiple 5-point Likert items (Table A1). Such composite Likert scores can be analyzed by linear regression, which is robust to moderate deviations from normality, and treated as approximately interval level. The preferred TPD format was not incorporated into a linear model as it was recorded as a single categorical choice and was presented as frequencies. Qualitative data from interview transcripts were analyzed using thematic analysis [14] [15]. The steps of the procedure are: 1) familiarizing with data through reading several times; 2) generating initial codes; 3) searching for themes through combining codes; 4) reviewing and refining themes; and 5) defining and naming the final themes. Inter-rater reliability was measured (Cohen's $\kappa = 0.85$) with two researchers (the author and Mr Simon, a research assistant on the project) independently categorizing 20% of the transcripts and discussing any inconsistencies.

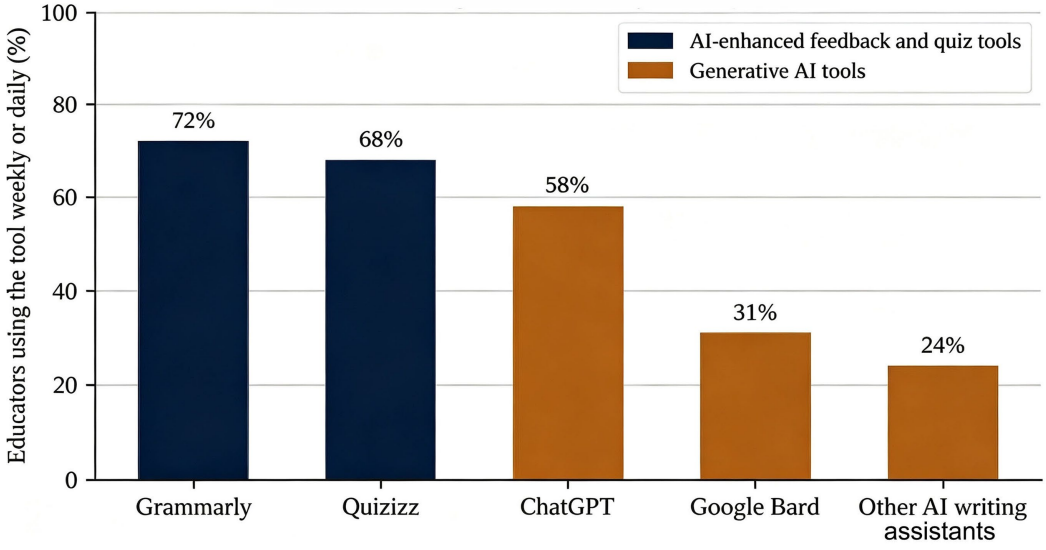
Finally, the results of the quantitative and qualitative analysis were integrated in the interpretation. The qualitative themes provided context, depth and explanatory power to the statistical patterns found in the survey data. There were two such instances of integration. The interview methodology was initially guided by

phase-one results; survey patterns that were in most need of explanation was followed up using the probes mentioned in Section 3.3.2. Second, we employed a combined display (see Section 4.2) to link the two strands during interpretation. For example, the survey found that the first most frequently rated topic of TPD was "Designing AI-integrated classroom activities", while the lowest self-rated competence was for more sophisticated applications like prompt engineering (both mentioned in Section 4.1). Interviewees were asked to identify the main challenges they faced, and to provide an example of how they have used an AI tool in their teaching to demonstrate this pattern. Theme 2, "practicality gap", was coded as their repeated descriptions of their understanding of AI theoretically but not being able to translate it into a lecture aligned with the curriculum. These two strands suggest that the need for activity-design training is not a lack of basic knowledge of tools, but rather problems in the pedagogical use of AI.

4. Results

4.1. Quantitative Findings

The descriptive study found that nearly all educators (95%) used digital resources in some form, but the usage of some AI tools was different. As shown in Figure 2, the most popular were grammar checkers such as Grammarly (72%) and AI-enabled quiz systems such as Quizizz (68%). Teachers used ChatGPT and other generative AI tools less often (58%), mostly for lesson planning and content generation, not for managing student-facing activities.

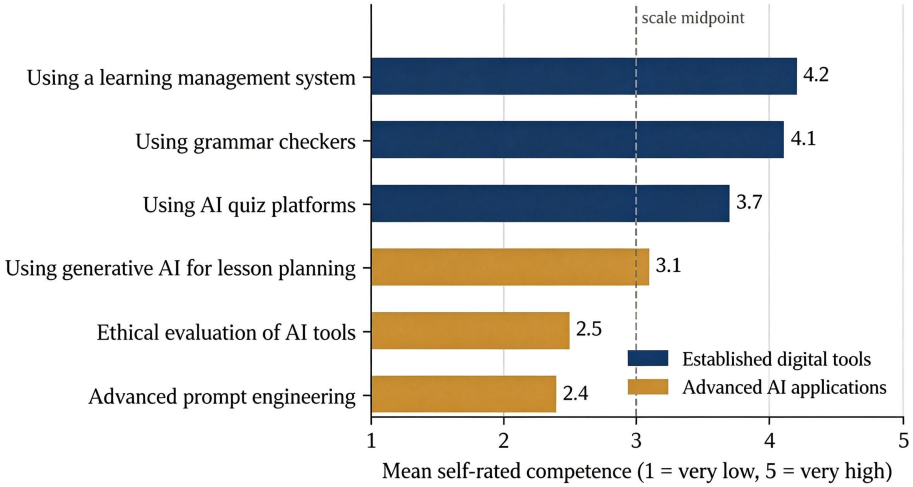


Note. Percentage of educators (N = 250) reporting weekly or daily use of each tool.

Figure 2. Frequency of use for selected digital and AI tools by educators.

Educators felt most competent using established digital resources, and least competent with advanced AI applications like prompt engineering (**Figure 3**).

Similarly, when asked to rank their needs for professional development (Figure 4), practical pedagogy-focused topics such as "Designing AI-integrated classroom activities" and "Strategies for teaching critical AI literacy" were ranked highest, while purely technical topics were ranked lowest.



Note. Mean ratings on a 5-point scale (1 = very low, 5 = very high); the dashed line marks the scale midpoint.

Figure 3. Educators' self-rated competence in techno-pedagogical skills.

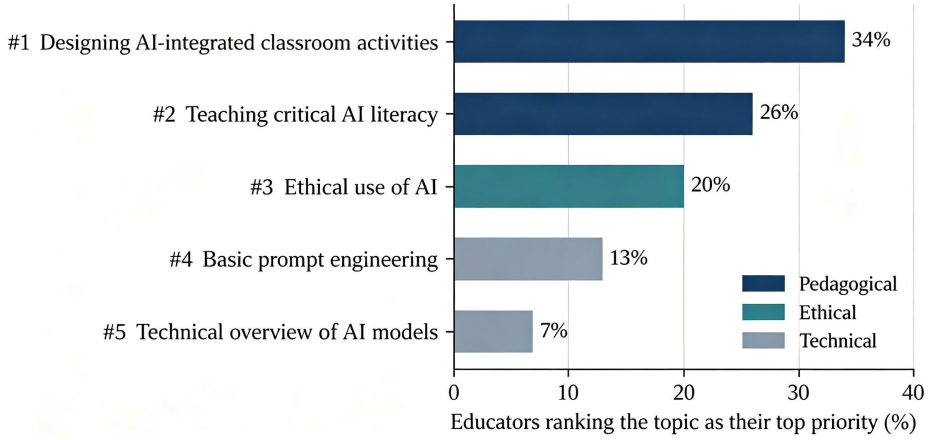


Figure 4. Ranked professional development needs. percentage of educators ranking each topic as their first priority.

Asked to select their single preferred format of TPD, 110 teachers (44%) chose a MOOC, 55 (22%) an in-person workshop and 85 (34%) a webinar series.

The results of the five-factor multiple regression analysis are summarized in Tables 1-4. Table 1 indicates that younger age ($\beta = -0.28$, $p < 0.001$) and previous participation in tech-focused TPD ($\beta = 0.35$, $p < 0.001$) were significant predictors of greater frequency of AI tool use. Years of experience and school type were not

significant predictors.

Table 1. Multiple regression predicting frequency of AI use.

Predictor	*B*	*SE B*	*β*
(Constant)	3.45	0.21	
Age	−0.15	0.03	−0.28***
Years of Experience	0.04	0.05	0.05
School Type (Public = 1)	−0.08	0.09	−0.06
Prior Tech TPD (Yes = 1)	0.52	0.10	0.35***

Note. $N = 250$. B = unstandardized coefficient; $SE\,B$ = standard error of B; β = standardized coefficient. Model fit: $R^2 = 0.24$, $F(4, 245) = 19.21$, $p < 0.001$.

Table 2 indicates that higher AI use frequency ($\beta = 0.41$, $p < 0.001$) and prior tech TPD ($\beta = 0.25$, $p < 0.001$) were strong positive predictors of perceived AI competence.

Table 2. Multiple regression predicting perceived AI competence.

Predictor	*B*	*SE B*	*β*
(Constant)	1.89	0.14	
Frequency of AI Use	0.45	0.06	0.41***
Prior Tech TPD (Yes = 1)	0.38	0.09	0.25***
Attitude towards AI	0.09	0.07	0.08

Note. $N = 250$. B = unstandardized coefficient; $SE\,B$ = standard error of B; β = standardized coefficient. Model fit: $R^2 = 0.31$, $F(3, 246) = 36.88$, $p < 0.001$.

As shown in Table 3, lower perceived AI competence ($\beta = -0.38$, $p < 0.001$) and a more positive attitude toward AI's potential ($\beta = 0.29$, $p < 0.001$) significantly predicted higher interest in AI-focused TPD.

Table 3. Multiple regression predicting interest in AI-Focused TPD.

Predictor	*B*	*SE B*	*β*
(Constant)	4.11	0.25	
Perceived AI Competence	−0.42	0.07	−0.38***
Attitude towards AI	0.35	0.08	0.29***
Frequency of AI Use	0.05	0.06	0.05

Note. $N = 250$. B = unstandardized coefficient; $SE\,B$ = standard error of B; β = standardized coefficient. Model fit: $R^2 = 0.28$, $F(3, 246) = 31.74$, $p < 0.001$.

Finally, Table 4 shows that a more positive attitude towards AI ($\beta = 0.22$, $p = 0.001$) and a higher frequency of AI use ($\beta = 0.19$, $p = 0.005$) significantly predicted a higher perceived importance of AI ethics training, indicating that teachers who

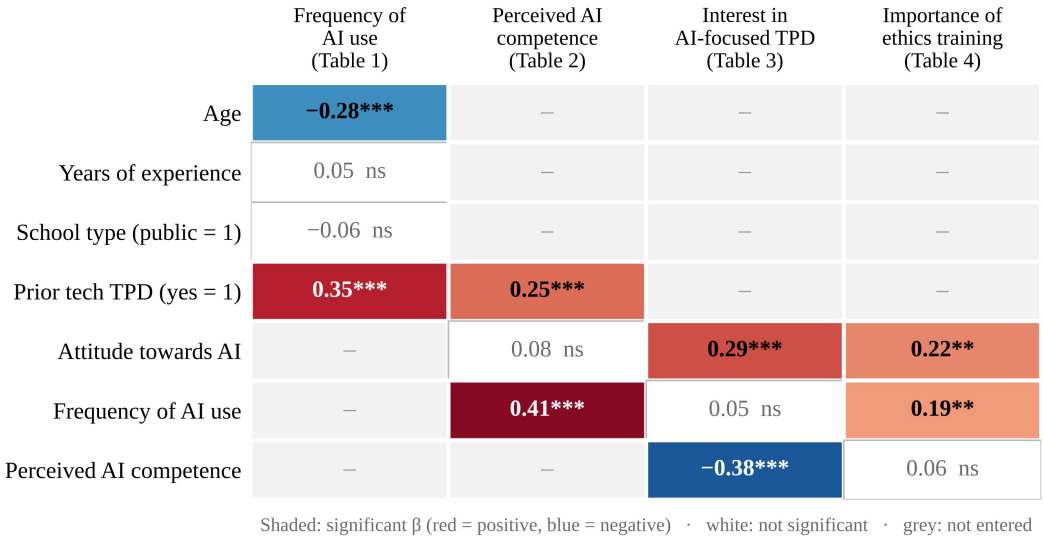
used AI more often also attached more importance to ethics training. Because the data are cross-sectional, this association does not show whether use heightens ethical awareness or whether ethically attentive teachers engage with AI more.

Table 4. Multiple regression predicting perceived importance of AI ethics training.

Predictor	*B*	*SE B*	*β*
(Constant)	2.98	0.27	
Attitude towards AI	0.25	0.08	0.22**
Frequency of AI Use	0.19	0.07	0.19**
Perceived AI Competence	0.06	0.07	0.06

Note. $N = 250$. B = unstandardized coefficient; $SE\,B$ = standard error of B; β = standardized coefficient. Model fit: $R^2 = 0.15$, $F(3, 246) = 14.52$, $p < 0.001$.

Figure 5 brings together the standardized coefficients from all five models. Prior technology-focused TPD, frequency of AI use, and attitude towards AI each reached significance in two models, and age and perceived AI competence in one, whereas years of experience and school type were not significant in any model.



Note. Cells show standardized coefficients (β) from Tables 1-4. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$. ns = not significant; – = predictor not entered in that model.

Figure 5. Standardized coefficients across the five regression models.

4.2. Qualitative Findings

Thematic analysis of the 15 interviews produced four major themes to explain and enrich the quantitative results. Table 5 associates each theme with the quantitative result and interview probe it helps to explain.

Theme 1: Hopeful yet Cautious. Most educators have a dual perspective on AI. They were optimistic about the potential for saving time and creating engaging materials but were cautious about its reliability and pedagogical implications. A

veteran teacher (18 years' experience) put this sentiment succinctly:

I can see the potential here, really. ChatGPT can help me differentiate a reading passage in minutes… but I worry. Are my students learning to think? Or just to prompt? It is a two-bladed knife.

This is consistent with the quantitative finding that positive attitudes predict interest in TPD and ethics training.

Table 5. Joint display of quantitative results, interview probes and qualitative themes.

Quantitative Result	Interview Probe	Qualitative Theme
Positive attitude predicts interest in TPD and ethics training (Table 3 & Table 4)	"What are your biggest hopes and fears about AI in education?"	**Theme 1: Cautious Optimism**
"Designing AI-integrated activities" is the top-ranked TPD need (Figure 4)	"Can you walk me through an example of how you've used an AI tool?"	**Theme 2: The "Practicality Gap"**
Prior TPD predicts AI use and competence (Table 1 & Table 2)	"What are the biggest hurdles you face when trying to use new technologies?"	**Theme 3: Time and Training as Critical Currencies**
MOOC/webinar preferred TPD format (44% + 34% = 78%)	"If you were designing a training course for your colleagues, what would be most important?"	**Theme 4: Desire for a Collaborative and Contextualized Community**

Note. Interview probes are from the protocol described in Section 3.3.2.

Theme 2: "Practicality Gap". There was a large gap between teachers' knowledge of AI tools and their ability to effectively integrate them into classroom practice. That "practicality gap" was a big source of frustration. A mid-career teacher said:

I've seen webinars on AI. I know the theory. But when I'm looking at 30 *students on a Monday morning, I don't know how to take that theory and turn it into a* 50*-minute lesson that works and that achieves my curriculum goals.*

This theme accounts for the high ranking of "Designing AI-integrated activities" as a TPD need (Figure 4).

Theme 3: Time and Training as Important Currencies. The biggest barriers to adoption were lack of time to experiment and lack of structured, ongoing training. One-off professional development days were perceived to be inadequate. A new teacher (3 years' experience) said:

We had an afternoon of AI in the classroom. It was interesting but then it was over. There's no one to ask when you get stuck. No follow-up. We need something ongoing, something we can do at our own pace.

This is indicative of the appeal of a flexible and self-paced format such as a MOOC and is consistent with the correlation between prior TPD and AI use and perceived competence (Table 1 and Table 2).

Theme 4: Desire for a Collaborative and Contextualized Community. Educators expressed a strong desire not to learn in isolation. They wanted to see examples from other teachers in similar contexts and to share their own successes and failures. An interviewee from a public school noted:

I do love to see what another 9*th-grade English teacher is doing with this. Not some tech guru, but a real teacher. What worked? What was a disaster? That's the*

kind of learning I need.

This points to the importance of incorporating a community of practice (CoP) element into any TPD design.

5. Discussion

The mixed-methods design of this study provides a detailed snapshot of the current status of AI integration among secondary school English teachers. The findings point to a teaching force that is curious and open to new technologies, but is constrained by a lack of practical training, time and pedagogical guidance. The quantitative findings show a few links: teachers who had prior technology-related training and more frequent AI use also reported higher perceived competence, and teachers with lower perceived competence and more positive attitudes toward AI were more interested in additional TPD. These statistics come to life in the qualitative themes. The central challenge is defined as a "practicality gap" and the importance of practical, collaborative, and ongoing TPD is underscored.

The observation that younger educators report more frequent use of AI is consistent with general trends in technology adoption, but the consistent association of prior TPD with both use of AI and perceived competence is particularly salient [12]. One interpretation, consistent with the interview accounts in Theme 3, is that initial training promotes use and builds confidence. However, as the data are cross-sectional, the direction of these relationships cannot be established; confident or frequent users may also have been more likely to seek out training. To test whether such a reinforcing cycle exists, longitudinal or intervention designs would be required. Conversely, a negative association between perceived competence and interest in TPD highlights a key target audience for intervention, namely educators who perceive themselves as lagging behind.

Educators stated needs are consistent with a growing body of literature suggesting that successful technology integration is not about the tools, but about the pedagogy that supports them [29]. The high demand for training on activity design and critical AI literacy, rather than technical specifications, points to a need to shift from "how to use the tool" to "how to teach with the tool". This distinction is important for the design of effective TPD. Also, greater use of AI was related to higher perceived importance of ethics training. Familiarity with AI might raise teachers' awareness of its societal and educational implications, although the cross-sectional data cannot rule out the opposite. In any case, the finding supports that ethics should be a core component of TPD [14].

5.1. Implications for a Mixed-Audience MOOC Design

Based on these integrated findings, we propose a conceptual framework for a mixed-audience MOOC aimed at secondary school English educators (**Figure 6**). This framework is built on four key principles derived directly from the data.



Note. Each design principle is shown with the evidence that motivates it. All participants complete a shared core module on ethics and critical AI literacy.

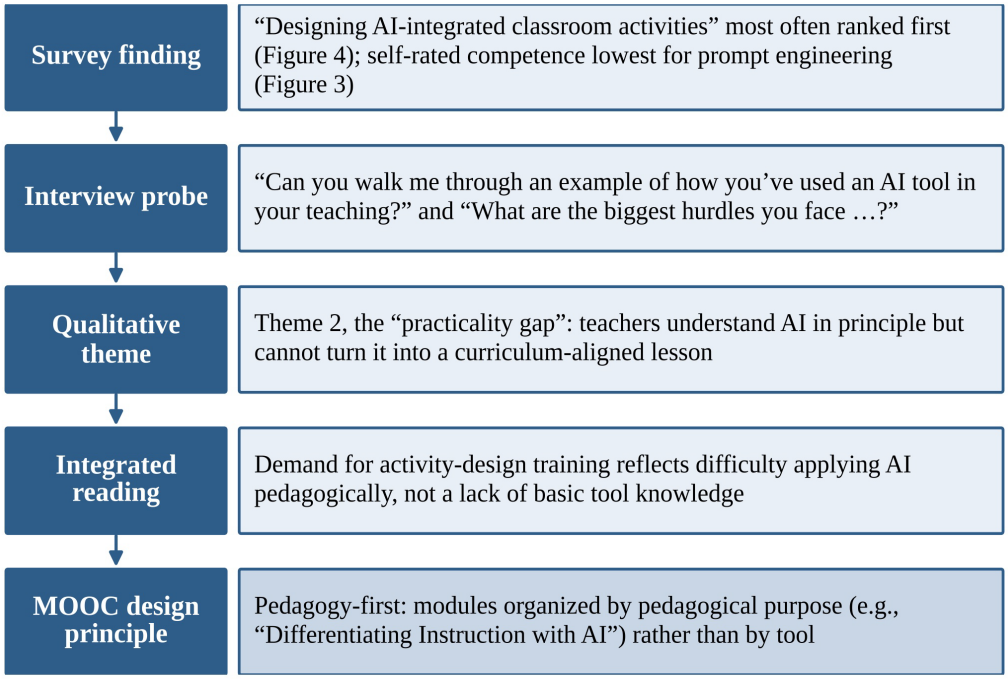
Figure 6. Conceptual Framework for a Mixed-Audience AI in ELT MOOC.

To cater to the mixed audience of novices and more experienced users identified in our data, the MOOC should not be a linear course. It should offer a tiered structure with distinct pathways. A "Foundations" track could support those with low perceived competence by covering basic concepts, tool overviews, and simple applications. An "Advanced" track could target more confident users, focusing on complex project design, prompt engineering for specific pedagogical goals, and leading school-level initiatives. All participants would engage with a core module on ethics and critical AI literacy.

The MOOC's content must directly address the "practicality gap". Instead of modules organized by tool (e.g., "Week 1: ChatGPT"), they should be organized by pedagogical purpose (e.g., "Module 1: Differentiating Instruction with AI", "Module 2: Fostering Writing Skills with AI Feedback Tools", "Module 3: Creating Interactive Speaking Activities"). This reframing centers the teacher's instruc-

tional goals, treating AI as a means to an end, not the end itself [33].

Figure 7 traces this principle back to the survey finding, interview probe and theme behind it, following the worked example described in Section 3.4.



Note. The chain follows the worked example in Section 3.4; Table 5 gives the corresponding links for all four themes.

Figure 7. Worked example: from survey finding to MOOC design principle.

All assignments should be authentic and directly applicable to the educators' classrooms to close the theory-practice gap [25]. For example, a task might be: "Use an AI tool to adapt a text for three different reading levels in your curriculum", rather than a multiple-choice quiz. Share the original text, the adapted versions, and the prompts you used. "Think about the process." This method encourages active learning and generates useful materials for teachers to use in their own classrooms.

A virtual Community of Practice (vCoP) should be integrated into the MOOC to encourage collaboration and to mitigate online learning isolation [28]. This could include structured discussion forums for sharing experiences, peer-review assignments in which teachers provide feedback on each other's AI-generated lesson plans and a repository of user-created resources. This supports the contextualized peer-to-peer learning that participants in our study craved.

5.2. Limitations and Future Research

Several limitations to this study exist. The sample was drawn from one urban area of Chad, an EFL context where English is a school subject but not a medium of instruction. The findings may therefore be most transferable to similar multilingual EFL systems in francophone Central and West Africa, and less directly to ESL

contexts, where English is also the language through which other subjects are taught, or rural Chadian schools with poorer digital infrastructure [34]. Social desirability bias may influence self-reported data on competence and frequency of use. The cross-sectional design captures a single point in time in a rapidly changing technology landscape. This also implies that the regression results only describe associations: they do not allow us to determine if training and use build competence, if more competent teachers seek out training and use AI more, or if these influences go both ways. Finally, we captured preferred TPD format as a single categorical item and analyzed it descriptively; future studies could model format choice directly, for example using multinomial logistic regression.

These results should be followed up in future research. A longitudinal study could follow a cohort of teachers taking such a MOOC based on the proposed framework to assess its influence on their practice and student outcomes. Comparative studies in different national and cultural contexts would also be useful [15]. Finally, research needs to keep investigating the changing competencies needed by teachers and students to succeed in an AI-rich educational ecosystem [5] [8].

6. Conclusion

The inclusion of AI in secondary English education is an exciting opportunity and a major challenge. The study shows that while teachers are cautiously optimistic about the potential of AI there is a significant "practicality gap" stopping them from fully utilizing it. The way forward is not top-down mandates or tool-focused training, but responsive, pedagogically grounded professional development that meets teachers where they are [12]. By systematically analyzing the needs of a mixed audience of educators, we have established the foundation for the design of a MOOC that is not just a repository of information, but a dynamic learning environment. The proposed framework, centered on modularity, pedagogical focus, practical application and community, provides a data-driven blueprint for empowering educators [28]. In the end, the preparation of teachers for the age of AI is not merely about instructing them in the use of new tools, but about providing them with the critical perspectives and pedagogical strategies that will enable them to lead their students into a future where human and artificial intelligence can coexist and collaborate effectively [5].

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Javier, D.R.C. and Moorhouse, B.L. (2023) Developing Secondary School English

Language Learners' Productive and Critical Use of ChatGPT. *TESOL Journal*, **15**, e755. https://doi.org/10.1002/tesj.755

[2] Szudarski, P. (2025) Vocabulary, Corpus and Language Teaching. A Machine-Generated Literature Overview. *ELT Journal*, **79**, 325-329. https://doi.org/10.1093/elt/ccaf006

[3] Ara, R., Chowdhury, M. and Hasan, M. (2026) Teachers' Attitudes toward the Use of Artificial Intelligence in ELT. Zenodo.

[4] Crutcher, P.A. (2024) Shouting into the "Thinking" Void: Education in the Context of Generative AI and ChatGPT. *Distance Learning*, **21**, 42-48. https://doi.org/10.1108/dl-01-2025-0003a

[5] Crompton, H., Edmett, A., Ichaporia, N. and Burke, D. (2024) AI and English Language Teaching: Affordances and Challenges. *British Journal of Educational Technology*, **55**, 2503-2529. https://doi.org/10.1111/bjet.13460

[6] Karlik, M. (2026) AI Advancements in English Language Teaching: Transforming the Classroom. *Colombian Applied Linguistics Journal*, **28**, 145-157. https://doi.org/10.14483/22487085.23869

[7] Maqsood, S., Haider, G., Iqbal, M., Ullah, A. and Hossain, M.R. (2026) The Impact of Artificial Intelligence on English Language Learning: Opportunities and Challenges. *Inverge Journal of Social Sciences*, **5**, 162-181. https://doi.org/10.63544/ijss.v5i4.327

[8] Du, J. and Daniel, B.K. (2024) Transforming Language Education: A Systematic Review of AI-Powered Chatbots for English as a Foreign Language Speaking Practice. *Computers and Education*: *Artificial Intelligence*, **6**, Article ID: 100230. https://doi.org/10.1016/j.caeai.2024.100230

[9] Julia, P. and Jeyanthi, B. (2026) Leveraging ChatGPT to Enhance Student Engagement and Motivation in English Language Classrooms: A Qualitative Study in Hyderabad Higher Education Contexts. Zenodo.

[10] Akhiar, A., Izhar, N.A. and Mohd Daniel, N.A. (2026) English Language Educators' Experiences and Perceived Support for AI Tools in Language Teaching. *International Journal of Modern Education*, **8**, 606-630. https://doi.org/10.35631/ijmoe.830039

[11] El Hamdaoui, S. and Eddouada, S. (2026) Readiness and Practice Gap in EFL: AI Integration in Moroccan High Schools. *International Journal of Language and Literary Studies*, **8**, 135-154. https://doi.org/10.36892/ijlls.v8i3.2628

[12] Rahmat, R. (2026) The Influence of AI Readiness, Digital Competence, and School Leadership on English Teachers' Adoption of Generative AI. *Journal of Organizational Management and Strategic Studies*, **2**, 1-12.

[13] Kostochka, I. and Ponomarova, N. (2026) The Use of Artificial Intelligence Tools in English Language Education in General Schools: Identifying Limitations, Risks, and Practical Approaches for Teacher Regulation. *Pedagogy of the Formation of a Creative Person in Higher and Secondary Schools*, No. 104, 113-117. https://doi.org/10.32782/1992-5786.2026.104.17

[14] Putri, T.A. and Prastiwi, Y. (2026) Perceptions and Experiences of Senior English Teachers Integrating Artificial Intelligence into ELT Practices. *Frasa*: *English Education and Literature Journal*, **7**, 243-251. https://doi.org/10.47701/frasa.v7i2.6036

[15] Uzma, and Aslam, S. (2026) AI in Language Teaching: Opportunities and Challenges for Public and Private Schools in Pakistan. *Contemporary Journal of Social Science Review*, **4**, 206-219. https://doi.org/10.63878/cjssr.v4i1.1963

[16] Halimah, N., Saud, I.W., Waris, A.M., Saini, F., Anuli, W.Y., Otoluwa, M.H., *et al.*

(2025) AI Technology Training to Enhance English Language Teaching for English Teachers. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, **7**, 906-915. https://doi.org/10.20527/btjpm.v7i4.16009

[17] Guo, Z. and Xu, Y. (2025) AI-Empowered Integrated Reform of Teacher Education: The Experience of a Chinese University. *Education and Lifelong Development Research*, **2**, 30-38. https://doi.org/10.46690/elder.2025.01.04

[18] Hui, O.Y., Yunus, M.M. and Lun, W.W. (2026) Artificial Intelligence Integration for Teaching and Learning English Writing: A Systematic Review on Strategies (2021-2025). *International Journal of Research and Innovation in Social Science*, **IX**, 3681-3698. https://doi.org/10.47772/ijriss.2025.91200286

[19] Safarzoda, T.S. (2026) Teaching Grammar through Modern Technologies. *HSR*, **12**, 134-136.

[20] Roshni, K. (2026) Role of Generative AI in English Language Teaching (ELT). *International Journal of Creative Research Thoughts*, **14**, d713-d715. https://doi.org/10.56975/ijcrt.v14i9.400291

[21] Kumari, K.G.B.S., Mohammad, S.I., Natarajan, R. and Vasudevan, A. (2025) The Algorithmic Adjuvant: Synthesizing Human Pedagogy and Artificial Intelligence in the Modern ESL Classroom with Insights from Uzbekistan. *Architecture Image Studies*, **6**, 246-252. https://doi.org/10.62754/ais.v6i3.217

[22] Subramanian, S.B. and Vairamuthu Emaraj, D.R. (2026) Leveraging Digital Platforms to Enhance ESL Reading and Writing Skills: A Case Study of Google Docs and Grammarly. *ILN Journal: Indian Literary Narratives*, **3**, 190-202. https://doi.org/10.70396/ilnjournal.v3n1.a.20

[23] Charos, I. (2026) AI-Assisted Literary Analysis as a Tool for Teaching Reading Skill. *American Journal of Integrated STEM Education*, **3**, 1-4. https://doi.org/10.47134/stem.v3i1.133

[24] Grigoryan, A. and Ghazaryan, L. (2026) The Role of Technology and Communicative Language Teaching in Improving ESL Speaking Skills. *International Journal of Research Publication and Reviews*, **7**, 3043-3046. https://doi.org/10.55248/gengpi.07.0726.2129

[25] Thúy, L.V. (2026) Integrating Artificial Intelligence to Support Teaching Writing Skills of Secondary School Teachers in Remote Areas of Vietnam: A Mixed-Methods Study on Instructional Innovation. In: Ghosh, R.K., Azar, A.S. and Dutta, S., Eds., *Sustainability and Green Technology Adoption in Education*, CRC Press, 157-164. https://doi.org/10.1201/9781003678069-12

[26] Daibes-Qadri, E. (2026) Artificial Intelligence in English Language Education: Teachers and Students Perspectives in Arab Secondary Schools in Israel. *International Journal of Advanced Research*, **14**, 883-892. https://doi.org/10.21474/ijar01/23011

[27] Asrifan, A. (2025) Artificial Intelligence (AI) to Support Curriculum Development for English Language Teaching in South Sulawesi's Secondary Schools. *JEELS* (*Journal of English Education and Linguistics Studies*), **12**, 939-976. https://doi.org/10.30762/jeels.v12i2.4737

[28] Huang, R., Cheng, E.C.K., Calleja, J. and Camilleri, P. (2025) Guest Editorial: Developing Generative AI-Informed Pedagogies through Lesson Study. *International Journal for Lesson & Learning Studies*, **14**, 187-196. https://doi.org/10.1108/ijlls-07-2025-278

[29] Laksanasut, S. (2026) Artificial Intelligence in EFL/ESL Education: Transforming Language Learning and Teaching through Adaptive Technology and Ethical Innova-

tion. *International Journal of Sociologies and Anthropologies Science Reviews*, **6**, 211-224. https://doi.org/10.60027/ijsasr.2026.10022

[30] Khalid, M.M., Hossain, M.R. and Ali, M. (2026) AI-Assisted Writing Anxiety: Mediating Effects of Metacognitive Strategies and Self Efficacy in ESL Contexts. *Journal of Engineering and Computational Intelligence Review*, **4**, 1-17. https://doi.org/10.63544/dnn8z540

[31] Granados, C. (2026) Editorial. *GIST—Education and Learning Research Journal*, **32**, 5-7. https://doi.org/10.26817/16925777.2230

[32] Ibrahim, W.A., Ibrahim, W.A., Okunnuwa, S.J. and Olaniyan, A.S. (2026) Assessment of Artificial Intelligence and Film-Based Media Integration in Innovative Language Teaching among Secondary School Teachers in Okitipupa Metropolis. *Federal University Gusau Faculty of Education Journal*, **5**, 82-89. https://doi.org/10.64348/zije.2025224

[33] Demana, N.V., Klu, E.K. and Maluleke, M.J. (2026) Exploring Rural-Based Secondary School Teachers' Professional Development Needs in Teaching English Pronunciation in Vhembe District, South Africa. *Indonesian EFL Journal: Journal of ELT, Linguistics, and Literature*, **12**, 1-16. https://doi.org/10.47759/faytws85

[34] Muslim, M., Chang, U., Rifat, A., Khan, M. and Jabeen, F. (2025) Teaching ESL in Rural Sindh: An Investigation of Challenges and Disparities in Selected Public Schools at Secondary Level. *Journal of Arts and Linguistics Studies*, **3**, 325-353. https://doi.org/10.71281/jals.v3i1.226

Appendix

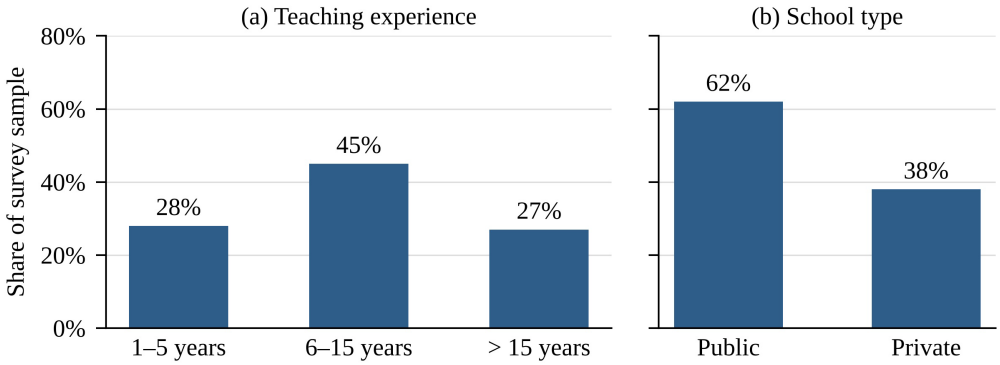
Appendix A. Measures Used in the Regression Analyses

Table A1. Items, response options, scoring and reliability of the survey measures.

Variable	No. of Items	Example Item	Response Options	Scoring	α
		Predictors			
Age	1	"What is your age in years?"	Open text	Years	–
Years of Experience	1	"How many years have you been teaching?"	Open text	Years	–
School Type	1	"What type of school do you teach in?"	Public/Private	1 = Public, 0 = Private	–
Prior Tech TPD	1	"Have you participated in any technology-focused professional development in the past two years?"	Yes/No	1 = Yes, 0 = No	–
Attitude towards AI	4	"AI is a valuable assistant for teachers."	1 = Strongly disagree, 5 = Strongly agree	Mean of items	0.85
		Outcomes			
Frequency of AI Use	5	"How often do you use AI tools (e.g., ChatGPT, Grammarly) for lesson planning?"	1 = Never, 5 = Daily	Mean of items	0.88
Perceived AI Competence	6	"How would you rate your ability to design a lesson that uses an AI tool?"	1 = Very low, 5 = Very high	Mean of items	0.91
Interest in AI-Focused TPD	3	"I am interested in participating in training to improve my AI skills."	1 = Strongly disagree, 5 = Strongly agree	Mean of items	0.89
Perceived Importance of AI Ethics Training	3	"Training on the ethical use of AI is essential for teachers."	1 = Strongly disagree, 5 = Strongly agree	Mean of items	0.86

Note. α = Cronbach's alpha; – = not applicable (single-item or categorical measure).

Appendix B. Participant Characteristics



Note. $N = 250$. Percentages as reported in Section 3.2.

Figure B1. Teaching experience and school type of survey participants.