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TEACHERS' READINESS TO USE ARTIFICIAL INTELLIGENCE TOOLS: ITS RELATIONSHIP WITH THE LEVEL OF TECHNOLOGICAL LITERACY

Parvina Meylikova
Shakhrisabz International Medical Technical College (SHXTT),
Kashkadarya Region, Uzbekistan
parvinameylikova2907@gmail.com

Abstract

This article examines English language teachers' readiness to use artificial intelligence (AI) tools in response to the rapid integration of AI technologies into foreign language education, with particular emphasis on the relationship between such readiness and teachers' level of technological literacy. The study is grounded in the Technological Pedagogical Content Knowledge (TPACK) framework and employs a descriptive-correlational, explanatory sequential mixed-methods research design. The research is intended to investigate the level of AI readiness, technological literacy, and the factors influencing AI adoption among English language teachers working in schools and higher education institutions in Uzbekistan through questionnaire surveys and semi-structured interviews. The expected findings suggest that technological literacy is one of the primary determinants of teachers' readiness to integrate AI tools into their pedagogical practice, while pedagogical knowledge, institutional support, and ethical awareness serve as significant moderating factors influencing the effective implementation of AI in educational settings. The findings are expected to contribute to the development of evidence-based recommendations for promoting the effective integration of AI technologies into foreign language teaching and enhancing teachers' digital competencies.

Keywords: Artificial intelligence, teacher readiness, technological literacy, TPACK model, foreign language education, digital competence, Uzbekistan.

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Introduction

Over the past decade, the integration of digital technologies, and of artificial intelligence (AI)-based tools in particular, has fundamentally reshaped the landscape of foreign language teaching. Generative AI tools such as ChatGPT, Grammarly, and DeepL now offer language learners personalized feedback, automated assessment, and expanded opportunities for independent study, while simultaneously giving teachers new instruments for lesson planning, material design, and differentiated instruction [1]. Yet the extent to which these technologies actually improve language education outcomes depends far less on the sophistication of the tools themselves than on the willingness and capacity of teachers to understand, evaluate, and meaningfully incorporate them into everyday classroom practice. Readiness, in this sense, is not a single attitude but a composite of knowledge, skill, confidence, and institutional support, and it is this composite that ultimately determines whether AI adoption in language classrooms becomes transformative or remains superficial [1; 2].

Several established theories help explain why some teachers embrace AI tools quickly while others hesitate or resist. Technology acceptance theory holds that a user's decision to adopt a new tool is shaped primarily by two perceptions: how useful the tool is believed to be, and how easy it is believed to be to use [3]. Building on this foundation, the Unified Theory of Acceptance and Use of Technology adds that social influence the opinions of colleagues, administrators, and the wider professional community and facilitating conditions, such as access to infrastructure, training, and technical support, exert a comparably strong effect on whether adoption actually occurs [4]. Generational and biographical factors compound these effects: teachers who grew up alongside digital technology, often termed "digital natives," tend to approach new tools with greater ease than colleagues who adopted digital practices later in their careers as "digital immigrants," and this generational positioning shapes not only technical comfort but also the speed and depth of pedagogical integration [5]. Taken together, these frameworks suggest that AI readiness among language teachers cannot be reduced to technical competence alone; it is the product of perception, social context, and infrastructure acting in combination.

Within language teacher education specifically, the most widely used lens for capturing this composite readiness is the Technological Pedagogical Content Knowledge (TPACK) model, which conceptualizes effective technology

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integration as the intersection of technological, pedagogical, and content-specific knowledge rather than any one of these domains in isolation [6]. Applying an extended, AI-oriented version of this framework, Chan and Tang developed and validated a TPACK-based instrument for assessing English teachers' readiness to integrate AI tools, finding that technological-pedagogical knowledge and information literacy were the strongest predictors of the overall TPACK construct – stronger, notably, than technological knowledge on its own [1]. This finding is echoed in research on pre-service teacher education: Karaduman found that although pre-service English as a Foreign Language (EFL) teachers expressed broadly positive attitudes toward ChatGPT and similar generative tools, their actual, hands-on AI literacy the ability to critically evaluate outputs, design AI-integrated tasks, and troubleshoot limitations remained considerably underdeveloped relative to their enthusiasm [2]. Together, these studies point to a recurring pattern in the literature: positive disposition toward AI is common among language teachers, but it is frequently unmatched by the deeper pedagogical and technical literacy needed to translate that disposition into effective practice.

This pattern takes on particular significance in the Central Asian context, and in Uzbekistan specifically, where the pace of national digital transformation now runs ahead of much of the empirical evidence on classroom-level readiness. Shakib Kotamjani and colleagues, in a qualitative study of university faculty across several disciplines, found that lecturers in Uzbekistan generally hold favorable attitudes toward AI and see clear potential for it to support skills development, student engagement, and employability, but that this enthusiasm is tempered by concrete infrastructural constraints – limited access to academic databases, uneven internet connectivity, and a shortage of quality digital resources that slow meaningful adoption in practice [7]. At the policy level, this local picture sits alongside an ambitious national agenda: Uzbekistan's National Strategy for the Development of Artificial Intelligence Technologies and large-scale initiatives such as the "Five Million AI Leaders" project signal a clear state commitment to accelerating AI literacy across the population, including within the education sector [8]. The juxtaposition of ambitious national policy with reported infrastructural and training gaps at the institutional level is precisely the tension that motivates closer empirical attention to teacher-level readiness.

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Despite this growing body of work, an important gap remains. Most existing studies on AI perceptions and readiness in Uzbekistan and comparable contexts have focused either on university lecturers' general attitudes toward AI across disciplines, or on the relatively narrow and less representative experience of pre-service teachers still in training [1; 2; 7]. Comparatively little quantitative research has examined, specifically among in-service English language teachers working in ordinary school and university settings, how their measured level of technological literacy relates to their readiness to use AI tools in day-to-day teaching. This gap is compounded by evidence from a separate but closely related strand of research: in a large-scale study of EFL teachers' digital literacy, Zhang found that digital literacy levels vary systematically with contextual factors, including years of teaching experience, though this relationship was examined in relation to general digital literacy rather than to AI-specific readiness [9]. It remains an open empirical question whether the same contextual patterns and in particular the apparent disadvantage of more experienced teachers in purely technical terms hold once AI tools, with their distinctive pedagogical and ethical demands, are considered specifically.

To address this gap, the present study sets out to examine the readiness of English language teachers in Uzbekistan to use AI tools in direct relation to their measured level of technological literacy, treating both variables as multidimensional constructs rather than single global scores. The study is guided by three research questions: first, what is the current profile of AI-tool readiness and technological literacy among English language teachers in Uzbekistan, both overall and across its component dimensions; second, is there a statistically significant relationship between technological literacy and readiness to use AI tools, and if so, how strong and in what direction; and third, to what extent do demographic and professional factors age, years of teaching experience, and prior participation in technology-focused professional development shape this relationship. Answering these questions is intended not only to fill an empirical gap in the regional literature but also to provide a concrete evidentiary basis for the design of AI-related teacher training policy in Uzbekistan.

Methodology

The study is designed as a descriptive-correlational investigation embedded within a broader explanatory sequential mixed-methods framework, in which an

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initial quantitative phase establishes the overall pattern of relationships among variables, and a subsequent qualitative phase is used to explain and contextualize those patterns in participants' own words. This two-phase design, in which quantitative breadth is deliberately paired with qualitative depth, follows the approach recommended in prior work that has piloted TPACK-based AI readiness instruments and found that numerical readiness scores alone do not adequately capture the reasoning behind teachers' acceptance or hesitation [1]. The population of interest comprises in-service English language teachers employed in secondary schools and higher education institutions across three regions of Uzbekistan Tashkent, Samarkand, and Fergana selected to capture variation in urban and regional teaching contexts. A stratified random sampling procedure will be used to recruit approximately 150 teachers for the quantitative phase ($n = 150$), stratified by years of teaching experience (0–5, 6–15, and more than 15 years) and by workplace type (secondary school versus higher education institution), with 12 teachers subsequently selected through purposive sampling from across these strata to take part in semi-structured interviews for the qualitative phase.

Data collection will rely on two complementary instruments. Readiness to use AI tools will be measured using a 36-item questionnaire built on the TPACK-based model, employing a 5-point Likert scale and organized into subscales corresponding to technological knowledge, pedagogical knowledge, technological-pedagogical knowledge, and information literacy, closely following the structure validated by Chan and Tang for English teachers specifically [1]. Technological literacy will be measured using an adapted version of the Teachers' Digital Literacy Questionnaire originally developed and validated by Zhang for EFL teacher populations, adjusted where necessary to reflect terminology and technology access patterns relevant to the Uzbek educational context [9]. Both instruments will be piloted with a small sample prior to full administration, and their internal consistency will be verified using Cronbach's alpha, with an acceptable reliability threshold set at $\alpha \geq 0.70$ for each subscale. The survey will be administered online through Google Forms to maximize reach across the three target regions; participation will be entirely voluntary and anonymous, and informed consent will be obtained from every participant before data collection begins. Once the quantitative data have been collected, the twelve interview participants will be invited to discuss their survey

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responses in greater depth, allowing the qualitative phase to probe the reasoning, experiences, and institutional circumstances underlying the statistical patterns observed.

Quantitative data will be analyzed in SPSS using descriptive statistics to characterize the overall distribution of readiness and literacy scores, Pearson correlation analysis to test the strength and direction of the relationship between technological literacy and AI readiness, and multiple regression analysis to determine the combined and relative contribution of technological literacy, teaching experience, and prior professional development to variance in readiness scores. Interview transcripts will be analyzed using thematic analysis, with codes developed both deductively from the TPACK framework and inductively from recurring patterns in participants' accounts, allowing the qualitative findings to both confirm and extend the quantitative results. It should be noted that the results presented in Section 3 below are model, illustrative data intended to demonstrate the article's reporting structure and analytical approach; once the study described above has actually been conducted, these placeholder figures should be replaced with the genuine statistical outcomes obtained from the fieldwork.

Results

Descriptive analysis is expected to show a moderate overall level of readiness to use AI tools among the sampled teachers, with a projected mean score of approximately M = 3.4 (SD = 0.68) on the 5-point scale, suggesting that most respondents occupy a neutral-to-positive position rather than either strong enthusiasm or outright resistance. This anticipated pattern is broadly consistent with Karaduman's finding that pre-service teachers display generally positive but practically limited readiness, and it would extend that finding to a broader population of in-service teachers working across varied institutional settings [2]. Within the readiness construct itself, subscale scores are expected to be uneven: technological knowledge and general enthusiasm for AI are anticipated to score comparatively highly, while the technological-pedagogical knowledge subscale the ability to integrate AI meaningfully into instructional design rather than simply operate the tools is expected to lag behind, mirroring the gap between attitude and applied competence repeatedly documented in the literature [1; 2].

With respect to technological literacy, scores are expected to be higher among teachers with fewer years of experience (0–5 years) and comparatively lower

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among more experienced teachers, a pattern consistent with the contextual effects of teaching experience on digital literacy reported by Zhang [9]. Central to the study's research questions, Pearson correlation analysis is expected to reveal a strong, statistically significant positive relationship between technological literacy and readiness to use AI tools, with a projected coefficient of approximately $r = 0.58$ ($p < 0.01$). Such a relationship would corroborate, in an in-service Uzbek teacher population, Chan and Tang's conclusion that technological-pedagogical knowledge and information literacy function as the principal predictors of the broader TPACK-based readiness construct [1]. Multiple regression analysis is further expected to show that technological literacy and prior participation in technology-focused professional development, taken together, account for a substantial share of the variance in readiness scores – an estimated 35 to 40 percent while years of teaching experience, considered on its own, is expected to exert a smaller but still statistically significant negative effect once literacy and training are controlled for.

The qualitative interview data are expected to surface three recurring themes that help explain the quantitative patterns in richer detail. The first, which might be described as a mixture of enthusiasm and caution, captures teachers' appreciation of AI's potential to reduce administrative and preparatory workload alongside a persistent worry that reliance on such tools could erode their own professional expertise and authority in the classroom a tension also documented by Üretmen Karaoğlu and Doğan in their study of EFL teachers' perspectives on AI integration [10]. The second theme concerns a perceived lack of institutional support, with teachers reporting that available professional development opportunities on AI are infrequent, poorly targeted, or altogether absent, echoing the infrastructural and training gaps identified by Shakib Kotamjani and colleagues in their study of Uzbek higher education faculty [7]. The third theme reflects concern about academic integrity, with teachers describing considerable difficulty in monitoring and addressing students' inappropriate or undisclosed use of AI tools for assignments, a concern that intersects with, but extends beyond, teachers' own readiness to use such tools in their instructional practice.

Discussion

Read together, the anticipated quantitative and qualitative findings converge on a single central conclusion: technological literacy functions as the primary gateway

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through which teachers approach AI adoption, but it is not, by itself, a sufficient condition for effective or confident use. The expected strong correlation between literacy and readiness lends empirical support to Rogers' diffusion of innovations framework, in which individuals with stronger baseline competence and confidence – his "early adopters" – move through the adoption process more quickly and with less friction than "laggards," who require more time, evidence, and support before committing to a new practice [11]. At the same time, the qualitative theme of enthusiasm tempered by professional caution indicates that adoption is not purely a function of skill: in line with Davis's technology acceptance model, teachers' perceptions of an AI tool's usefulness for their specific teaching goals, and of how easily it can be incorporated without disrupting established pedagogical routines, appear to shape willingness to adopt just as much as raw technical competence does [3]. This helps explain a pattern visible across the wider literature and echoed in this study's anticipated results: some technically capable teachers nonetheless approach AI adoption cautiously, not because they lack skill, but because they have not yet been persuaded of its pedagogical value or its compatibility with their professional identity.

The infrastructural and institutional constraints anticipated in the qualitative findings likewise deserve close attention, because they point to a structural rather than purely individual explanation for uneven readiness. Unstable internet access, limited availability of licensed AI-enabled software, and a fragmented, inconsistent approach to in-service professional development together illustrate a wider gap between the ambition of national policy and the lived reality of classroom practice. Shakib Kotamjani and colleagues [7] and Kodirova [8] both describe an accelerating state-level push toward AI integration in Uzbekistan, yet the teacher-level evidence anticipated here suggests that this push has not been matched by proportionate investment in the facilitating conditions – reliable infrastructure, accessible training, institutional guidance – that Venkatesh and colleagues identify as essential complements to individual motivation and skill in any successful technology adoption process [4]. Without deliberate attention to these facilitating conditions, national-level AI strategies risk remaining aspirational documents rather than practical drivers of classroom change, however well-intentioned they may be.

Finally, the anticipated age-related pattern, in which younger and less experienced teachers report higher technological literacy than their more

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experienced colleagues, aligns with Prensky's well-known distinction between digital natives and digital immigrants [5], but the discussion should resist treating this distinction as a fixed or unbridgeable divide. Zhang's research indicates that the pedagogical depth and classroom judgment accumulated by experienced teachers over years of practice can substantially offset an initial technological disadvantage once appropriately targeted training is provided [9], suggesting that experience should be treated not as a barrier to be worked around but as a complementary strength to be paired deliberately with focused technical support. Read in this light, the overall pattern of results argues for professional development strategies that are differentiated by career stage rather than uniform across the teaching population: early-career teachers may benefit most from guidance on pedagogically sound and ethically responsible integration of tools they already use comfortably, while more experienced teachers may benefit most from structured, low-pressure opportunities to build baseline technical familiarity that can then be combined with their existing pedagogical expertise.

Conclusion

Taken as a whole, this study is expected to demonstrate that English language teachers' readiness to use AI tools in Uzbekistan is closely and significantly related to their level of technological literacy, while also showing that this relationship is neither simple nor purely technical in character: it is shaped in practice by teachers' pedagogical knowledge, by the institutional and infrastructural support available to them, and by genuine ethical and professional concerns about the changing nature of teaching in an AI-saturated classroom. Rather than treating technological literacy as an isolated variable to be improved through generic computer training, the findings point toward the need for continuous professional development that is explicitly organized around the TPACK model, so that technical skill-building is consistently paired with guidance on pedagogically meaningful and ethically sound integration of AI into actual lesson design and assessment practice. Because the anticipated data suggest that more experienced teachers face a distinct set of challenges from their younger colleagues, such professional development should be differentiated by career stage rather than delivered as a single uniform program, offering step-by-step, low-pressure technical training to experienced teachers while helping early-career teachers deepen the pedagogical and ethical dimensions of tools they may

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already use with ease. At the same time, improving individual teachers' literacy and confidence is unlikely to be sufficient on its own without parallel investment in the facilitating conditions identified throughout this discussion: schools and universities need reliable internet infrastructure and access to licensed AI tools, together with clear, well-communicated institutional policies on acceptable AI use and academic integrity that give teachers a stable framework within which to experiment and adapt. Finally, given the ambitious scope of Uzbekistan's national AI strategy and related initiatives such as the "Five Million AI Leaders" project, there is a clear need to more closely align these high-level policy efforts with the everyday realities and expressed needs of practicing teachers, ensuring that national digital transformation goals translate into concrete, adequately resourced support at the classroom level rather than remaining confined to policy documents. Future research building on this study would benefit from a larger and more geographically diverse sample, a longitudinal design capable of tracking how readiness evolves as training and infrastructure improve over time, and comparative analysis across teachers of different subject areas to determine whether the patterns identified here are specific to language education or reflect a broader dynamic across the teaching profession as a whole.

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