

Teacher Readiness for AI-Based Teaching Environment at Secondary Level in AJ&K

Fatima Ashraf

[fatimaashraf696@gmail.com](mailto:fatimaashraf696@gmail.com)

M. Phil Scholar, Department of Education, University of Kotli AJ&K

Nosheen Rashid

[nosheenrashid001@gmail.com](mailto:nosheenrashid001@gmail.com)

M. Phil Scholar, Department of Education, University of Kotli AJ&K

Nageena Bashir

[nageenabaig74@gmail.com](mailto:nageenabaig74@gmail.com)

M. Phil Scholar, Department of Education, University of Kotli AJ&K

Dr. Muhammad Nageeb ul Khalil Shaheen

[nageeb.shaheen@gmail.com](mailto:nageeb.shaheen@gmail.com)

Assistant Professor, Department of Education, University of Kotli AJ&K

Corresponding Author: Dr. Muhammad Nageeb ul Khalil Shaheen [nageeb.shaheen@gmail.com](mailto:nageeb.shaheen@gmail.com)

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ABSTRACT

*The increasing prevalence of Artificial Intelligence (AI) into educational settings has had profound effects on the way teaching and learning happen in secondary education settings. With the growing adoption of AI-related technologies, adaptive learning platforms, and intelligent tutoring systems in classrooms, teacher preparedness in terms of effectively working with and using AI technologies becomes paramount. This paper examines the extent to which secondary-level teachers in Azad Jammu & Kashmir (AJ&K) are ready for AI integration based on their technology literacy, ability to adapt, attitude towards the use of such technologies, and the level of institutional support. Using a combination of quantitative and qualitative research methods, a survey was conducted among 280 in-service teachers across 12 districts of AJ&K and semi-structured interviews were conducted with 24 selected participants. Despite a considerable number of teachers who hold positive attitudes towards AI (67.8%), a clear lack of proficiency is observed in AI-specific technical skills ( $M = 2.87$  out of 5.0) and ethics ( $M = 2.94$  out of 5.0). The factors preventing teacher readiness include poor infrastructure, insufficient professional development opportunities, and lack of institutional policy frameworks for AI integration. Drawing upon findings, an empirically-based Teacher AI Readiness Framework (TAIRF) consisting of five components.*

**Keywords:** AI readiness, secondary education, teacher competency, AI-TPACK, professional development, intelligent learning environments, pedagogical adaptability, AI literacy

INTRODUCTION

To be totally upfront, avoiding work is the pattern that I continually vow to correct and just fall straight back into. I set out to get to work early the next morning, only to look up at 11 p.m. and realize I have done absolutely nothing besides browse social media all day. The odd part about this problem is that the work is rarely the difficulty it takes me roughly ten minutes from the time I finally force myself to click on the document until the first paragraph is down. This is all preceded by the anxiety, attempts to begin, and regret for wasting my time. Honestly, procrastination does not stem from laziness; it comes from fear of starting.

I must say that procrastination is one of those things that I have had problems with for a long time now. I put my alarm on, make sure that I start early, but I end up staring at the computer screen till close to midnight without even typing a single word, only scrolling. What is sad is that once I finally start working, I can complete the first paragraph within ten minutes almost effortlessly. Everything else goes wrong before this point stress, attempts, and regretting wasted hours. From personal experience, I can tell you that procrastination has absolutely nothing to do with laziness. It has to do with trying to avoid a certain feeling.

Truthfully, procrastination has been with me for as long as I can remember and the habit which has proven hardest for me to correct. Every night, I assure myself that tomorrow I will get to work; at 11 pm, however, I find myself on my cell phone without having made any progress. What truly astonishes me, however, is just how nonchalant the process itself is once I actually open up the document, it writes the opening paragraph almost entirely on its own within ten minutes. The real torture, of course, lies in the hours spent in anticipation, the failed attempts, and the same afterword.

Another factor contributing to the problem of inadequate application of Artificial Intelligence technologies is the existence of existing structural barriers. Not all countries have sufficient internet infrastructure, as well as devices and support required to apply Artificial Intelligence technologies efficiently. In highly industrialized states, there are still many areas where the use of such technologies becomes problematic due to various barriers related to the economic development level, internet connection quality, as well as teacher's technological skills. An example is Pakistan (AJ&K), where the use of such technologies is not yet widespread due to geographical and administrative factors.

The study provides a lot of valuable insights that need to be mentioned. Firstly, the review carried out in this paper takes into account a lot of empirical information about the topic under discussion with the emphasis on the issue of teachers' readiness for the implementation of artificial intelligence in secondary-level schooling. Secondly, the paper uses novel empirical data gathered within the scope of mixed methods approach. Finally, a special framework called Teacher Artificial Intelligence Readiness Framework (TAIRF) was created.

### **Research Objectives**

The study was guided by the following objectives:

1. To assess secondary school teachers' current levels of AI literacy and technical competence.
2. To examine teachers' attitudinal orientation toward AI integration in their pedagogical practice.
3. To identify the key institutional, infrastructural, and personal barriers to AI readiness.
4. To explore the perceived professional development needs of secondary teachers for effective AI integration.
5. To propose a contextually grounded framework for assessing and enhancing teacher AI readiness.

### **Research Questions**

1. What is the current state of AI literacy among secondary school teachers?
2. What factors significantly predict teacher readiness for AI-based teaching environments?

3. What barriers do secondary teachers face in integrating AI into their instructional practice?
4. What professional development interventions are perceived as most effective for enhancing teacher AI readiness?

## **LITERATURE REVIEW**

### **Conceptualizing AI in Secondary Education**

AIEd is a wide-ranging area that incorporates diverse technologies including adaptive learning technologies that personalize students' educational experiences, natural language processing technologies that facilitate writing, computer vision technologies used to monitor classrooms, and predictive analytics technologies for predicting which students may drop out (Kalnina et al., 2024; Sun et al., 2024). The field of secondary education has seen tangible benefits from the implementation of AI technologies in areas such as engagement, skill personalization, and assessments (Evans & Sinha, 2024).

The field of AIEd has undergone massive transformations with the advent of large language models (LLMs). Starting from 2022, the likes of ChatGPT have made their entry into education in lightning speed, posing both hopes and fears (Bengesi et al., 2024). For secondary educators, the use of LLMs can mean a lot of differentiation, which is possible through generating texts with differing degrees of difficulty, offering instant feedback on student papers, and assisting with curriculum development. On the other hand, LLMs have sparked worries about cheating, accessibility, and cognitive strain.

Policy solutions on an international scale have been inconsistent, with 61% of all countries recognizing the strategic significance of AI in education, but only about 30% having implemented a full teacher training program (Fteiha et al., 2025). The policy practice gap is most evident in the classroom, where teachers find themselves dealing with AI in classrooms without much institutional support.

### **Dimensions of Teacher Readiness**

Teacher readiness theory can be described as a robust one that raises a number of concerns in terms of empirical evidence. Generally, it is defined as a measure of how ready the teacher is in possessing the necessary qualities in order to implement the innovation in his/her teaching process. In relation to AI specifically, teacher readiness should be seen as multidimensional including:

- **Cognitive/Knowledge Dimension:** Understanding AI concepts, capabilities, limitations, and ethical implications.
- **Skills/Technical Dimension:** Ability to use AI tools, evaluate AI-generated content, and integrate AI into lesson design.
- **Attitudinal Dimension:** Beliefs about AI's value, concerns about displacement, and openness to technology-mediated change.
- **Pedagogical Dimension:** Capacity to adapt instructional methods to leverage AI while maintaining learner-centred practice.
- **Institutional/Contextual Dimension:** Access to infrastructure, administrative support, and professional development opportunities.

In Ding et al. (2024), "the lack of sufficient understanding and competence about AI" is the most commonly mentioned problem hindering successful implementation, whereas, in Ozer-Altinkaya et al. (2025), one of the identified areas of deficiency in research is the study of processes through which the knowledge influences the readiness of educators for change. The difference between having knowledge about AI and knowledge regarding the effective teaching with AI needs to be addressed, because many educators know enough about machine learning, but not about its educational application.

### **The AI-TPACK Framework**

The Technological Pedagogical Content Knowledge (TPACK) model, which was developed by Mishra & Koehler in 2006, is currently the predominant paradigm used to investigate the role of technology in education. The TPACK concept is concerned with the interaction between knowledge of technology (TK), pedagogy (PK), and content (CK). However, to cater to the unique nature of AI as pedagogical technology, researchers have come up with the AI-TPACK model (Celik, 2023; An et al., 2023).

AI-TPACK brings into the already established framework the specific knowledge of technologies related to AI, which refers to knowledge about machine learning algorithms, natural language processing, and AI-based data analysis techniques. Significantly, AI-TPACK does not focus on technical skills in AI applications but highlights the importance of being knowledgeable about how AI technology may change the knowledge structure of a particular content domain and classroom sociodynamics (Mishra & Henriksen, 2023). The recent study conducted by Chen et al. (2024), involving 400 teachers, has shown the validity of the AI-TPACK construct and found that intersections between AI-TK, PK, and CK predict better integration of AI technologies than AI-TK alone.

In more recent times, Ng et al. (2025) have put forth the Human Centric AI Pedagogy (HCAP), a framework that expands on AI-TPACK through two new competency areas namely Human-AI Collaborative Knowledge and Ethical Knowledge. Such advancements in TPACK are a result of understanding that pedagogic use of AI raises important ethical issues that go beyond simple skill usage.

**Table 1: Summary of Key Theoretical Frameworks for Teacher AI Readiness**

<b>Framework</b>	<b>Core Constructs</b>	<b>Application Context</b>	<b>Year</b>
TPACK	TK, PK, CK and intersections	General technology integration	Mishra & Koehler, 2006
AI-TPACK	Adds AI-specific TK layer	AI tools in K-12 classrooms	Celik, 2023
AI Literacy Model	Know, Do, Reflect on AI	K-12 curriculum design	Ng et al., 2021
HCAP Framework	AI-Tech, AI-Content, AI-Pedagogical, Ethical	Teacher education programs	Ng et al., 2025
KAP Model	Knowledge, Attitudes, Practices	In-service teacher assessment	Fteiha et al., 2025

### **Barriers and Enablers of Teacher AI Readiness**

Barriers to teacher readiness to integrate AI have been extensively documented in the literature, and infrastructure deficiencies, such as unreliable internet connection, shortage of devices, and absence of technical support, have emerged as important obstacles especially for developing countries (Kalnina et al., 2024; Abdulayeva et al., 2025). The study conducted by Researchgate (2024) discovered that lack of training (65%), technology limitation (45%), and issues related to data privacy (40%) were identified as major barriers for Italian secondary school teachers.

In terms of the individual, self-efficacy beliefs of teachers are effective predictors of readiness. According to Bandura's (1997) self-efficacy theory applied to the integration of AI, if teachers feel incompetent in AI, then even in the presence of necessary resources, they are unlikely to integrate AI. Professional development programs have been found to increase the self-efficacy of teachers regarding the use of AI in teaching (Yang et al., 2024). The positive attitude, specifically when viewed in light of constructivist teaching ideologies, is indicative of readiness, and teachers who have faith in the active role played by learners in the process are ready to adopt AI (Thomas & Anderson, 2022).

The institutional enablers include policy clarity in AI, administrative support, and professional learning community interactions. In fact, according to the Centre for Democracy and Technology's report on 2025 Schools and AI, it was observed that while 85% of the teachers had adopted AI technologies during the 2024-25 school year, fewer than half had undergone AI training programs provided by the school, reflecting the existing disparity between practice and preparation.

### **RESEARCH METHODOLOGY**

#### **Research Design**

In this research work, a sequential explanatory mixed methods approach has been applied (Creswell & Plano Clark, 2018). In the first phase, quantitative data collection has been done through a survey questionnaire in order to determine the degree of teacher preparedness for AI. In the next phase of the study, qualitative data collection has been done through semi-structured interviews in order to expand upon findings from the quantitative analysis. The choice of sequential explanatory approach was suitable because this psychosocial variable needs to be explained through narratives.

#### **Sample and Sampling**

The target population consisted of secondary school teachers (Grades 9 through 12) working in either governmental or private institutions. The study adopted purposive sampling to obtain a sample that would be representative with regard to geographic location (urban, semi-urban, and rural areas), school type, gender, and subject of teaching. The sample consisted of 280 respondents (87.5% response rate).

**Table 2: Demographic Profile of Survey Respondents (N = 280)**

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	162	57.9
	Female	118	42.1

School Type	Government	178	63.6
	Private	102	36.4
Location	Urban	98	35.0
	Semi-Urban	112	40.0
	Rural	70	25.0
Teaching Experience	0–5 years	74	26.4
	6–15 years	112	40.0
	16+ years	94	33.6
Age Group	25–35 years	96	34.3
	36–45 years	108	38.6
	46+ years	76	27.1

### **Instrument Development**

The quantitative instrument in the form of the Teacher AI Readiness Scale (TAIRS) was specifically created for the current research. The TAIRS is based on the framework of AI-TPACK (Celik, 2023), Knowledge, Attitude, Practice (KAP) model (Fteiha et al., 2025), and literacy dimensions suggested by Ng et al. (2021). It consists of 42 Likert scale questions divided into 5 sub-groups. The quantitative instrument in the form of the Teacher AI Readiness Scale (TAIRS) was specifically created for the current research. The TAIRS is based on the framework of AI-TPACK (Celik, 2023), Knowledge, Attitude, Practice (KAP) model (Fteiha et al., 2025), and literacy dimensions suggested by Ng et al. (2021). It consists of 42 Likert scale questions divided into 5 sub-scales, including:

The semi-structured interview included 14 open-ended questions aimed at understanding teachers' experience with AI technologies, challenges encountered, areas where training is required, and their vision of AI-assisted teaching methods. Interviews took 35 to 55 minutes and were recorded with participants' permission.

### **Data Analysis**

The quantitative data was analyzed using SPSS (Version 28) and R (Version 4.3). Means and standard deviations served to describe readiness constructs. In order to establish predictors for the entire AI-readiness construct, multiple regression analysis was used. Independent-samples t-tests and one-way ANOVA were conducted to identify differences between demographic categories. Transcripts of all semi-structured interviews were generated verbatim. Reflexive thematic analysis was then performed on this qualitative data using NVivo (Version 14) based on Braun & Clarke's (2022) framework.

### **Ethical Considerations**

The participants gave consent for participation before collecting any data. This process was completely voluntary, and the participants were made aware that they could withdraw from the study without penalties at any time. The collected data were anonymous and properly stored. Ethical approval for the study was obtained from the university's research ethics committee (UREC/2024/087).

### **RESULTS AND FINDINGS**

#### **Overall, AI Readiness Profile**

Description of TAIRS subscale scores showed considerable differences between readiness dimensions. The highest level of teachers' readiness to AI was observed in Attitudinal Orientation subscale (M=3.67, SD=0.71). At the same time, AI Literacy (M=2.87, SD=0.84) and Ethical Awareness (M=2.94, SD=0.79) were the most difficult dimensions for teachers. Thus, positive attitude is not always connected with high-level knowledge and awareness.

**Table 3: Descriptive Statistics for TAIRS Subscales (N = 280)**

<b>Subscale</b>	<b>Mean (M)</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Interpretation</b>
AI Literacy	2.87	0.84	1.20	4.80	Below Moderate
Pedagogical Adaptability	3.24	0.76	1.40	5.00	Moderate
Attitudinal Orientation	3.67	0.71	1.80	5.00	Above Moderate
Institutional Support	2.76	0.92	1.00	4.60	Below Moderate
Prof. Development Needs	4.02	0.68	2.20	5.00	High Need
Overall Readiness	3.31	0.64	1.56	4.84	Moderate

#### **AI Literacy and Competency Gaps**

A review of the AI literacy scale indicated that less than one-third of the teachers surveyed (28.6%) received formal training on artificial intelligence. Of those with some form of training related to artificial intelligence, most were informally trained through online videos (47%), peers (32%), and individual trial-and-error (21%). Less than 10% reported institutionalized professional development for AI.

The gap analysis on an item level revealed important competency areas that require improvement. The three lowest-ranking items included the following: "I am aware of how machine learning makes its prediction" (M= 2.14, SD= 0.91); "I can evaluate the results produced by AI in terms of possible biases" (M= 2.31, SD= 0.88); and "I am aware of privacy issues associated with AI technology when working with my students" (M= 2.44, SD= 0.87). These gaps are in line with findings by Yim and Wegerif (2024) who argued that educators experience considerable difficulties in comprehending AI's capacities, limitations, and ethical considerations.

**Table 4: AI Competency Levels Among Secondary School Teachers**

Competency Area	High (4–5)	Moderate (3–3.99)	Low (1–2.99)
General AI Awareness	31.4%	43.2%	25.4%
Ability to Use AI Tools	24.6%	38.9%	36.5%
Understanding AI Ethics	19.3%	34.7%	46.0%
AI in Lesson Planning	22.1%	36.4%	41.5%
Evaluating AI Outputs	15.7%	29.6%	54.7%
Student Data Privacy	17.8%	31.1%	51.1%

**Attitudinal Dimensions**

Even though there were considerable gaps in the knowledge base, teacher attitudes towards AI were overwhelmingly positive. When the teachers were asked to describe their general attitude towards AI in teaching, 67.8 percent gave responses that ranged from positive to very positive, 18.9 percent had a neutral attitude, and only 13.3 percent had negative attitudes towards the technology. These numbers have been substantiated by qualitative data, such as:

*"I feel that using AI will change the way in which I will be able to provide differentiation for my class. I have students at very different levels, and this will be helpful. However, I am concerned about those students without access to the internet."*

*(Female teacher, Science, Urban Government School (Interview P-7))*

Among younger teachers (below 35 years), there were many more positive attitudinal scores ( $M = 3.89$  compared to  $M = 3.48$  among those above 45 years,  $p < 0.01$ ). The attitudinal scores of private school teachers were significantly higher compared to their government school counterparts ( $M = 3.84$  compared to  $M = 3.54$ ,  $p < 0.05$ ).

**Barriers to AI Integration**

A hierarchy of barriers was found through both quantitative ranking and qualitative description. The most serious institutional infrastructure barriers were ranked. Thematic analysis of interview responses revealed six main barrier themes:

**Table 5: Perceived Barriers to AI Integration (N = 280, Multiple Response)**

Barrier Category	Respondents (%)	Interview Theme
Lack of formal AI training	78.2%	Professional Development Gap
Inadequate internet/device access	71.4%	Infrastructure Deficit

No institutional AI policy	64.6%	Policy & Governance
Limited time for professional development	61.1%	Workload Constraints
Concerns about AI accuracy & bias	55.4%	Trust & Reliability
Student data privacy concerns	49.3%	Ethical Dimensions
Unclear curriculum alignment	47.5%	Curriculum Integration
Fear of technology replacing teacher role	31.8%	Professional Identity

**Predictors of AI Readiness: Regression Analysis**

In the current study, multiple linear regression analysis was done to investigate significant determinants of AI readiness among the teachers (using TAIRS scale). These variables were gender, years of experience in teaching, school affiliation, location, prior AI training, self-efficacy, and institutional support. The entire model was significant ( $F(7, 272) = 28.64, p < .001$ ), and it accounted for 42.3% of the variance in teacher AI readiness ( $R^2 = .423, \text{Adjusted } R^2 = .408$ ).

**Table 6: Multiple Regression Analysis: Predictors of Teacher AI Readiness**

Predictor Variable	$\beta$	SE	t-value	p-value	Sig.
Prior AI Training (Yes/No)	0.38	0.054	7.04	<.001	***
Institutional Support	0.31	0.061	5.08	<.001	***
Self-Efficacy in Technology	0.27	0.059	4.58	<.001	***
School Type (Private)	0.19	0.072	2.64	.009	**
Teaching Experience (years)	-0.14	0.048	-2.92	.004	**
Location (Urban)	0.11	0.068	1.62	.107	ns
Gender (Female)	0.08	0.071	1.13	.261	ns

Note:  $\beta$  = standardised regression coefficient; SE = standard error; \*\*\*  $p < .001$ ; \*\*  $p < .01$ ; ns = not significant. Dependent variable: Overall TAIRS Score.

The variable prior AI training had the highest value for predicting readiness ( $\beta = 0.38$ ), followed by institutional support ( $\beta = 0.31$ ) and technology self-efficacy ( $\beta = 0.27$ ). It is worth mentioning that teaching experience had a negative impact on readiness. This could be explained by the fact that younger teachers are characterized by better AI attitudes and more familiarity with AI technology in the context of their personal educational experience.

**Professional Development Needs**

Teacher's PD needs were measured using the TAIRS PD subscale and described during interviews. The PD subscale achieved the highest mean rating among all other factors examined in this research (M = 4.02). Teachers found the need for the following types of professional development programs.

**Table 7: Teacher-Prioritized Professional Development Areas (% Rating as High Priority)**

Professional Development Area	High Priority (%)
Using AI tools for lesson planning and materials	82.5
AI-based formative assessment strategies	77.1
Ethical use of AI with secondary students	74.6
Understanding AI fundamentals and limitations	71.8
Preventing & detecting AI-assisted academic dishonesty	69.3
Differentiating instruction using adaptive AI platforms	65.7
Critical evaluation of AI-generated content	63.2

Qualitative data reinforced the quantitative priority ordering. Participants emphasized the need for PD that is contextualized to their subject discipline ("I don't need general AI training I need to know how AI can help me teach photosynthesis and cell biology"), sustained over time rather than one-off workshops, and peer-collaborative in structure.

**The Teacher AI-Readiness Framework (TAIRF)**

Drawing on the theoretical literature and empirical findings of this study, the Teacher AI-Readiness Framework (TAIRF) is proposed as an integrated model for assessing and developing secondary school teachers' readiness for AI-based teaching environments. The TAIRF comprises five interrelated dimensions, each of which must be addressed in concert for readiness to be holistic and durable.

**Table 8: The Teacher AI-Readiness Framework (TAIRF): Dimensions and Indicators**

Dimension	Core Constructs	Sample Indicators	Assessment Method
1. AI Literacy	Conceptual AI knowledge; data literacy; understanding of ML and NLP basics	Explain how a recommendation algorithm works; identify AI bias in output	Knowledge test + portfolio

2. Pedagogical Adaptability	AI-TPACK competencies; instructional design with AI; learner-centred AI deployment	Design an AI-enhanced lesson for heterogeneous learners	Lesson design rubric
3. Ethical Awareness	Privacy; bias; academic integrity; equitable access; transparency	Identify data privacy risks; design fair AI use policy for classroom	Case analysis + reflection
4. Institutional Support	Policy alignment; infrastructure access; administrative backing; collaborative culture	Rate infrastructure adequacy; access to technical support	Institution audit + survey
5. Continuous PD	Self-directed learning; CPD engagement; reflective practice; learning community membership	Hours of AI-related CPD; participation in AI communities of practice	PD portfolio + log

TAIRF is a diagnostic and developmental tool, rather than a measurement instrument. The diagnostic aspect will help educational institutions and policy-makers diagnose any readiness gaps in the various dimensions to target appropriate interventions. The developmental aspect will be useful in the development of a framework for scaffolded professional development from awareness to competency to innovation regarding the use of AI.

The framework borrows concepts from previous models. It borrows the knowledge framework of AI-TPACK (Celik, 2023). It borrows aspects from HCAP model (Ng et al., 2025) through Human-AI Collaborative and Ethical dimensions. It borrows aspects from self-efficacy paradigm (Yang et al., 2024) where attitude is seen as a prerequisite condition.

## DISCUSSION

Concluding remarks indicate that the AI readiness of secondary school teachers is a complex situation in which there exist positive attitudes as well as competency deficiencies, ambitions for professional development hindered by indifference on the part of the organization, and individual variances that emerge because of professional development training and not demographics. Several factors need clarification.

### The Attitude-Competence Gap

One of the most crucial findings from the above-mentioned analysis concerns the inconsistency between attitudinal orientation, with  $M = 3.67$ , and the level of AI literacy, with  $M = 2.87$ . On the one hand, the educators are enthusiastic about the adoption of AI technologies and are convinced that such innovations would be valuable for their students. However, at the same time, they lack the necessary expertise and fundamental knowledge to utilize the technology successfully. This problem seems similar to the findings

of the Centre for Democracy and Technology study conducted in 2025, which states that 85 percent of the teachers adopted AI, but only 49 percent of them received any training in doing so.

Here, the issue does not concern solely individuals but rather suggests systemic problems. The fact that regression analysis revealed prior AI training as the strongest factor contributing to AI readiness ( $\beta = 0.38$ ) is indicative of the same thing; the provision of such training can make a significant difference towards improving readiness levels. What makes this difficult to achieve is the scarcity of such training opportunities. As indicated by the findings of this study where 8.9% of the participants had undergone institutional AI PD, many countries are yet in the developmental stage of devising AI-related policies.

### **Experience as a Risk Factor**

In relation to the negative relationship between teaching experience and AI readiness ( $\beta = -0.14$ ), this relationship can be viewed from a theoretical perspective. Teachers who possess more experience are usually in their mid-forties and fifties, which means that they received their basic education prior to the advent of AI in teaching. They might have set-in-stone teaching methods, which are now challenged by technology. In addition, their level of confidence in technology could be low due to the stable environment in which they worked throughout their career..

### **Infrastructure and the Digital Equity Problem**

Institutional support ( $M = 2.76$ ) was found to be the significant weakness for the respondents in this study, specifically among rural government schools' teachers who have reported inadequate infrastructure in their schools. This is significant for two reasons, first of which is that this directly affects equity. In situations where there is no infrastructure in the school, such as adequate internet connectivity, availability of devices, and technical support, it is not possible to improve teacher AI readiness through only individual effort..

However, the equity aspect applies to learners too. According to Evans & Sinha (2024), early exposure to AI could promote identity formation among marginalized students provided that it is done carefully by well-trained teachers in resourceful environments. The danger is that in poorly resourced contexts and without properly trained teachers, AI education could widen the learning gap even further.

### **The TAIRF in Context**

The proposed Teacher AI-Readiness Framework is such that its deployment is feasible even in resource-poor environments. Each of the five components that make up the framework can easily be quantified using straightforward means (surveys, portfolio assessment, lesson plan writing tasks) without having to rely on sophisticated technology. Developmental possibilities that could stem from the framework include peer mentoring, professional online training courses, and workshops on incorporating AI in particular subjects at little cost. The Teacher AI-Readiness Framework is indeed multilevel, as it takes into account the capabilities of teachers and the institutions within which they operate.

### **CONCLUSION**

In summary, this research presented a systematic approach to analyzing the preparedness of teachers for working in an environment with AI tools. While the findings can be described as both promising and disappointing, they do not provide clear guidelines for action. Promising in terms of a considerable share of teachers displaying a positive attitude towards AI and a strong willingness to participate in further professional training. Disappointing in the form of a gap between a positive attitude and necessary competence and knowledge of teachers.

The proposed model of the Teacher AI Readiness Framework (TAIRF) represents a holistic approach to analyzing and increasing readiness on all five dimensions: AI Literacy, Pedagogical Flexibility, Ethical Sensitivity, Institutional Context, and Professional Development. TAIRF incorporates knowledge from several areas including AI-TPACK Theory, Self-Efficacy Theory, and Institutional Assessment.

For the secondary-level education system to harness the revolutionary potential of AI in relation to personalized learning, adaptive assessment, and inclusion, preparation of teachers is required through professional development programs and policies, ethical considerations, adequate technological support, and reflective practices. Teacher preparedness in the context of AI should not just be considered from the point of professional development alone since it includes educational equality and quality issues.

### **RECOMMENDATIONS**

Based on the findings, the following recommendations are advanced:

- Governments and educational authorities should establish mandatory, sustained AI professional development programmes for all in-service secondary teachers, with particular attention to career-stage differentiation.
- Teacher education institutions should redesign pre-service programmes to integrate AI literacy, AI-TPACK competencies, and AI ethics as core curriculum components.
- Schools should develop and publish clear AI use policies that guide both teacher practice and student expectations, reducing uncertainty and building trust.
- Infrastructure investment must precede or accompany AI integration initiatives: connectivity, device access, and technical support are prerequisite conditions.
- Researchers should develop and validate culturally contextualized AI readiness instruments for use in diverse national settings.
- The TAIRF should be piloted and further validated in multiple educational contexts to refine its dimensions and indicators.

### **Limitations and Future Research**

There are many limitations associated with this study. First of all, although the sample selected for analysis comes from different locations, it is collected from a certain regional environment (Azad Jammu & Kashmir, Pakistan), making results not universally generalizable. Secondly, self-reported measures of competencies might contain social desirability bias. Finally, a cross-sectional approach does not allow us to make any causal inferences about our results. In future research, a longitudinal study should be used in order to track readiness development after implementing interventions. Furthermore, competency tests instead of self-reports should be conducted.

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