Technology Acceptance and Faculty Readiness for AI-Integrated Teaching in Higher Education

Ijaz Hussain[1], Asifa Parveen[2] and Shahana Parveen[3]

https://doi.org/10.62345/jads.2026.15.2.11

Abstract

The recent integration of artificial intelligence (AI) into higher education has altered educational processes, but faculty preparedness to teach with AI is uneven, especially in developing countries. Though previous studies have comprehensively examined students' technology acceptance, scant empirical research has examined faculty members' readiness to embrace AI tools and integrate the technology into their pedagogy. Based on the Technology Acceptance Model, this paper examines the association between technology acceptance variables and the faculty preparedness to AI-based embedded learning in Indian institutions of higher education in Punjab, Pakistan. The research used a quantitative correlational design. The data were collected from 350 faculty members via stratified random sampling across public and private universities. Perceived usefulness, perceived ease of use, attitude towards AI, AI self-efficacy, and faculty preparation to teach using AI were measured using a structured questionnaire. The proposed hypotheses were tested using descriptive statistics, Pearson correlation analysis, and multiple regression. The results show that perceived usefulness, attitude to AI, and AI self-efficacy have a strong positive correlation, which predicts faculty readiness to use AI-integrated teaching, whilst perceived ease of use has a relatively weaker but positive relationship. The model shows a high proportion of variance in faculty readiness, with both psychological and cognitive variables playing crucial roles in AI adoption. The research has a role to play in generalizing technology acceptance theory to the realm of AI-based pedagogy, as well as in effectively implementing institutional policy, faculty development curricula, and strategic digital transformation programs in higher education.

Keywords: Artificial Intelligence, Faculty Readiness, Technology Acceptance, Higher Education, AI-Integrated Teaching.

Introduction

Artificial Intelligence (AI) has disrupted the higher education sector, introducing new computer-aided tools that support individualized learning, automated evaluation, and smart decision-making (Al Abdullatif, 2024). University classrooms are increasingly adopting technologies such as adaptive learning systems, generative AI tools (e.g., ChatGPT), and automated grading

[1]*Assistant Professor, Department of Education, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan.*
Email: Ijhussain@gudgk.edu.pk
[2]*Lecturer, Department of Education, Ghazi University, Dera Ghazi Khan, Punjab, Pakistan.*
Email: aparveen@gudgk.edu.pk
[3]*CTI Govt. Graduate College Shah Sadar Din, Dera Ghazi Khan, Punjab, Pakistan.*
Email: shahanaparveen051997@gmail.com

Compliance with ethical standards: There are no conflicts of interest (financial or non-financial). This study did not receive any funding.

systems, offering opportunities to improve the quality of teaching, student interest and motivation, and the effectiveness of university administration.

The worldwide transition to AI-powered learning gained momentum during the COVID-19 pandemic, when faculty were forced to switch to online and hybrid systems with limited time. There is no longer a need to focus solely on the same basic technical skills as conventional educational technologies, making teaching via AI systems require an instructor to redesign the pedagogical module, be ethically mindful, and be self-efficacious in the digital realm (Tekin, 2024). For example, generative AI may be used to facilitate lesson planning, content development, and formative assessment, but its successful integration would require a critical review of these tools, their alignment with learning goals, and evaluation of their effects on student learning outcomes.

Faculty readiness thus has various dimensions: technical competence, pedagogical flexibility, psychological flexibility, and institutional support. Technical competence encompasses the ability to use AI tools effectively, whereas pedagogical adaptability encompasses the capacity to integrate AI into teaching methods in a meaningful way. Psychological openness is a sign of confidence, motivation, and readiness to embrace AI, and institutional support entails training programs, infrastructure, and policy advice. Unless it is properly prepared, an AI introduction can be ad hoc, shallow, or self-contradictory, thereby limiting its radical potential in higher education (Bibi et al., 2025; Qureshi et al., 2025).

The Technology Acceptance Model (TAM) is a useful framework for analysing AI adoption, in which the most important predictors of technology acceptance are perceived usefulness and perceived ease of use (Davis, 1989). According to recent research, TAM may be further elaborated through former constructs, with the addition of AI self-efficacy and AI-related attitude, as more effective factors that can serve to explain faculty preparedness to teach AI-based learning in higher education, particularly in developing nations, where the digital literacy and institutional assistance are not uniform (Tazeen Huma et al., 2025). Faculty readiness is hence the key to developing targeted training programs, formulating effective policies, and successfully integrating AI into teaching and learning.

Problem Statement

Despite the rise in AI adoption in university education, faculty preparedness remains uneven, especially in developing nations such as Pakistan. Many instructors lack the required technical knowledge, pedagogical strategies, and confidence to implement AI tools in teaching. Although TAM gives a theoretical underpinning to the understanding of technology adoption, the application of TAM to AI in higher education and faculty preparedness is a relatively new area, and the universities are left without sufficient guidance to implement an effective faculty training program (Qureshi et al., 2025; Bibi et al., 2025). Summing up, the present research will examine the topic of “Technology acceptance and faculty preparedness to AI-integrated teaching in university teaching.

Research Gap

Despite the existing literature on the subject, there is limited empirical evidence on faculty preparedness for AI-integrated education in developing economies. The view about the faculty is not addressed in the majority of the studies that involve students or infrastructure. Research applying TAM to investigate various predictors of faculty readiness has been reported in the higher education context (Tazeen Huma et al., 2025).

Literature Review

Theoretical Foundations of Technology Acceptance

The Technology Acceptance Model (TAM) remains among the most widely applied frameworks for researching technology adoption in education. TAM, initially formulated by Davis (1989), posits that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are strong factors influencing users' acceptance and intent to use technology. Such constructs have been empirically established in interdisciplinary and evolving educational technologies. Regarding AI, TAM has been expanded to include new psychological and contextual factors, such as self-efficacy and trust, to better understand adoption patterns (Al Abdullatif, 2024).

Recent studies have shown that AI-specific concepts, such as AI literacy, intelligent pedagogical knowledge (TPACK), and perceived trust, are of great importance to acceptance among higher education faculty. TAM-based research by Al Abdullatif (2024) concluded that AI literacy and perceived ease of use were strong predictors of acceptance of generative AI tools, with other constructs such as intelligent TPACK and trust playing mediating roles. This underscores the need to go beyond traditional TAM models in examining teachers' adoption of AI.

According to other scholars, the TAM, when used with complementary models such as Self-efficacy and Anxiety dimensions, provides a complete picture of technology acceptance among teachers. To illustrate that self-efficacy and anxiety are critical elements to consider in TAM, Tekin (2024) incorporated them into the model and found that self-efficacy positively influences acceptance, whereas anxiety about AI negatively influences behavioral intentions to use AI.

Faculty Readiness for AI Integration

The faculty readiness dimension is multidimensional, encompassing technical competence, pedagogical adaptation, confidence, and institutional support. The readiness of educators to adopt AI tools is determined by their attitudes toward the usefulness of technology, training opportunities, and their belief in the effective use of AI in teaching (Frontiers Study, 2025).

According to the Frontiers study (2025), perceptions of ease of use and usefulness are positively associated with teachers' readiness to work with AI in classroom assessment. It determined that readiness is critical when considered through technological and pedagogical readiness (including alignment of beliefs with technology capability) and thus validated the constructs of TAM whilst making clear the importance of the pedagogical belief system in readiness.

Likewise, an empirical study based on the Pakistani population revealed that although the majority of the faculty understand the potential of AI to improve the efficiency of teaching, ethical issues, the problem of privacy of data, and the insufficient readiness to implement AI are still among the most important impediments to the complete implementation. The results indicate that there is a great demand for professional development programs and a code of ethics to sustain the faculty's preparedness.

AI Adoption in Regional and Developing Country Contexts

Studies in developing nations are valuable for indicating the significant influence of context on technology acceptance and readiness. Bibi et al. (2025) surveyed teachers in Pakistan's higher education sector and found that most perceive AI as a means to make their work more effective, but significant questions remain about preparedness due to infrastructure constraints and ethical considerations. These data indicate that individual beliefs are not the only determinants of faculty readiness; institutional and cultural factors also influence it.

In a study on the usage of AI in Pakistani schools among teachers, it was also found that many teachers have a rather positive attitude towards AI, which is particularly prevalent in the domain of planning lessons and instructional materials development. Nevertheless, its practical application is not entirely even, and the absence of systematic training and infrastructural support was identified as a weakness in the realization of the potential of AI integration.
The same trends are supported by international research. An Estonian study found that perceived usefulness and readiness are essential predictors of AI adoption, which aligns with the finding that confidence, competence, and perceived educational value play a significant role in predicting teachers' intention to apply AI tools in their practice.

Technology Acceptance, Self-Efficacy, and Psychological Factors
In addition to the main constructs of TAM, other psychological preparedness variables identified as major influences on technology adoption include self-efficacy, anxiety, and attitudes toward technology. The use of self-efficacy as a positive predictor of AI technology acceptance and anxiety as a negative predictor in Tekin's (2024) expanded version of the TAM model indicates that psychological elements should be integrated into discussions of cognitive acceptance of AI technology.
Moreover, a multinational study of university educators in the Arab states showed that technology preparedness and social influence are even better predictors of the perceived utility and usefulness of generative AI than anxiety, but that a supportive environment and peer influences are the conditions necessary for acceptance.

Pedagogical Beliefs and AI Integration.
Technology acceptance interacts with educators' values and assumptions regarding teaching and learning to shape preparedness. The integration research indicates that the more teachers align their pedagogical ideology with the possibilities of AI technologies, the higher their preparedness for implementation is. For example, a Frontiers (2025) study found that positive pedagogical beliefs positively affected perceived usefulness and willingness to adopt AI, confirming the notion that a full understanding of technology acceptance requires consideration of instructional philosophies.
The connection between specific pedagogical knowledge and context is a point that research on TPACK and AI readiness also emphasizes. Improved content knowledge of technological pedagogy (TPACK), including the addition of AI literacy, has affected perceptions of usefulness and ease of use, which are fundamental to faculty acceptance and preparedness.

Challenges and Barriers to Faculty Readiness
Educators face several obstacles to implementing AI in teaching, despite increased interest. These include:

- Lack of professional development opportunities tailored to AI tools
- Insufficient confidence and technical skills to use AI effectively
- Ethical concerns, including academic integrity and data privacy
- Infrastructure limitations such as poor connectivity and resource constraints

In Pakistan, the lack of connectivity and the absence of organized AI training were identified as barriers to successful AI implementation in educational practice. In this case, educator training is seen as the basis for preparing better and making AI devices an addition rather than a complication to the teaching process.

The literature suggests that, whereas technology acceptance theories, such as TAM, remain useful for cognitive understanding of AI adoption, they should be complemented with other constructs, such as self-efficacy, pedagogical beliefs, and institutional support, to provide an adequate explanation of faculty willingness. As demonstrated by empirical data from both developed and developing contexts, perceptions of usefulness, ease of use, confidence, and contextual support are foundational to educators' willingness to adopt AI technologies in teaching.

Empirical Studies (New 5-7 Years old)

Recent empirical studies highlight the crucial importance of faculty technology acceptance and readiness in AI-integrated teaching. Articles researched in both developed and developing countries provide insights into predictors of adoption, faculty perceptions, and challenges.

1. Al Abdullatif (2024) studied the level of acceptance of generative AI tools by university teachers in higher education. The researchers concluded that adoption was predictive of AI literacy, perceived usefulness, and intelligent TPACK, whereas perceived trust mediated the relationship between technological competence and behavioral intention. The paper noted that cognitive and pedagogical readiness are key to successful AI integration.
2. Tekin (2024) examined the attitudes of teachers towards the use of AI according to the extended model of TAM. The results showed that self-efficacy was positively associated with adoption, whereas anxiety about AI was not, which affected teachers' behavioral intentions. This implies that psychological preparation is vital in determining faculty readiness, along with cognitive acceptance.
3. Qureshi et al. (2025) carried out research on faculty attitude and preparedness to use AI in the teaching process in Pakistan. The outcomes indicated that although faculty recognized the value of AI tools, their willingness to adopt them was constrained by limited training, poor infrastructure, and ethical concerns. Readiness was highly predicted by perceived usefulness and attitude towards AI.
4. Bibi et al. (2025) examined the application of AI in Pakistani institutions. The researchers established that the readiness was influenced by pedagogical beliefs and institutional support. Faculty members with strong alignment between pedagogical goals and AI capabilities had a higher adoption rate. It was found that the absence of institutional support is one of the main obstacles to successful integration.
5. Tazeen Huma et al. (2025) explored the institutional preparedness towards AI in higher education in South Asia. Their results revealed that contextual factors, including infrastructure, policy settings, and training opportunities, significantly influence faculty preparedness. Faculty adoption was positively related to perceived usefulness and ease of use, thereby validating the TAM constructs in the AI context.
6. In a multinational study of AI preparedness, Frontiers in Education (2025) has stated that technical competence, pedagogical fit, and self-efficacy were key predictors of faculty preparedness. The higher the faculty members' digital literacy and pedagogical alignment with AI tools, the higher the adoption intentions.

Taken together, the studies show that a complex of technology acceptance constructs (PU, PEOU), psychological factors (self-efficacy, attitude), pedagogical support, and institutional support influence faculty readiness for AI-integrated teaching. They support the need for a quantitative study in the Punjab context to systematically investigate predictors of faculty readiness.

Conceptual Framework

The technological readiness is guided by the Technology Acceptance Model (TAM) and extended to include psychological and pedagogical readiness determinants as the conceptual framework of this study. The framework also identifies major independent variables that affect faculty preparedness for teaching integrated with AI.

Predictors (Independent Variables)

Domesticated Usefulness (PU): The perception of AI as a successful tool within teaching and learning by the faculty.

Perceived Ease of Use (PEOU): Perception of the university faculty regarding the effective use of AI tools.

AI attitude, A general view of faculty on AI integration, whether positive or negative.

AI Self-Efficacy: Faculty confidence in the use of AI tools in pedagogical activities.

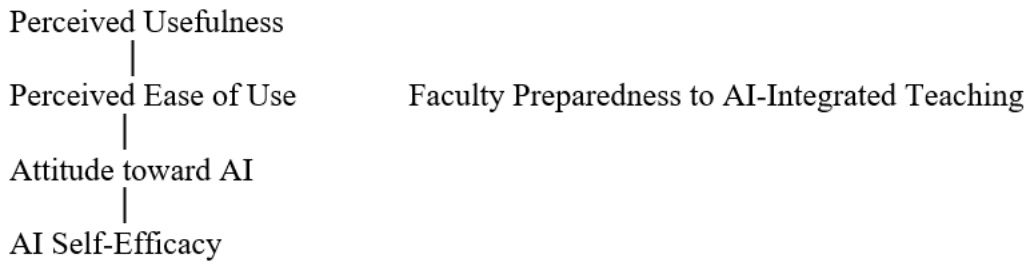
Dependent Variable

Faculty Preparedness to Teach AI-Integrated: The general readiness of faculty to positively utilize AI tools, including technical, pedagogical, and psychological readiness.

Proposed Relationships

- PU, PEOU, attitude and self-efficacy ⟶ faculty readiness
- PU, PEOU, attitude, and self- efficacy may directly influence faculty readiness.
- Indirect effects of PU and PEOU may be between readiness and attitude and self-efficacy.

Figure 1: Conceptual Model Diagram



As shown in the model, faculty preparedness depends on cognitive acceptance factors (PU, PEOU), attitudinal factors, and psychological preparedness (self-efficacy). This framework is consistent with recent empirical research (Al Abdullatif, 2024; Tekin, 2024; Qureshi et al., 2025) and serves as the basis for the quantitative testing of the proposed hypotheses.

Methodology

Research Design

The research design is a quantitative correlational study that aimed to investigate the relationship between technology acceptance and faculty readiness to teach with AI. A correlational design will be suitable, as the researcher can examine associations and predictive relationships among the independent variables (perceived usefulness, perceived ease of use, attitude toward AI, AI

self-efficacy) and the dependent variable (faculty readiness) without controlling for them (Creswell & Creswell, 2018).
A cross-sectional survey design was used, which provides a picture of faculty perceptions and readiness at a given point in time and allows generalization across higher education institutions in Punjab, Pakistan.

Population and Sampling
The targeted population included faculty members from both public and privately owned universities in Punjab, Pakistan. Universities that had adopted AI-related tools during teaching were chosen, and faculty interested in technology-mediated instruction were required.
Population Size: The count of 1,002 faculty members in reputable universities was used, but it was not determined.
Sample Size: The Cochran formula was used to determine the required sample size for a finite population with a 95 percent confidence level and a 5 percent margin of error; the resulting sample size was 350 faculty members.
A stratified random sampling method was used to achieve representation from both the public and private sectors, as well as across the various academic departments (Education, Sciences, Humanities, and Engineering). Stratification helps minimize sampling bias and proportionately represents the faculty across institutional types.

Instrumentation
The primary data were collected by developing a structured questionnaire. The questionnaire was based on validated scales from recent research on the associations between technology acceptance and AI integration in education (Al Abdullatif, 2024; Tekin, 2024; Qureshi et al., 2025).

Questionnaire Structure
Section A -Demographic
Age, gender, academic rank, teaching experience, department, and prior experience with AI tools.

Section B -Technology Acceptance Variables
- Perceived Usefulness (PU): 5 items
- Perceived Ease of Use (PEOU): 5 items
- Attitude toward AI: 5 items
- AI Self-Efficacy: 5 items

Section C - Faculty Readiness to AI-Integrated Teaching
10 items assessing technical, pedagogical, and psychological readiness.
Measurement Scale: Measurements were done using a 5-item Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Instrument validity/ reliability
Content Validity
To ensure the questionnaire's content validity, David enlisted the assistance of five educational technology and AI integration experts. The experts' suggestions were included to enhance clarity, relevance, and exhaustiveness.

Construct Validity

A pilot study was conducted involving 30 faculty members from institutions not part of the main study. All scales were subjected to the validation of construct validity by the use of Exploratory Factor Analysis (EFA). Items with factor loadings less than 0.50 were eliminated.

Reliability

Cronbach's Alpha was used to test the internal consistency. The results were as follows:

- Perceived Usefulness: $\alpha = 0.88$
- Perceived Ease of Use: $\alpha = 0.85$
- Attitude toward AI: $\alpha = 0.86$
- AI Self-Efficacy: $\alpha = 0.87$
- Faculty Readiness: $\alpha = 0.90$

All values exceeded the recommended value of 0.70, indicating good reliability (Nunnally and Bernstein, 1994).

Data Collection Procedure

1. The university research ethics committee gave approval.
2. The members of the faculty were reached through email and institutional announcements and informed about the purpose of the research and the fact that participating was voluntary.
3. A questionnaire was conducted online through Google Forms so that the data could be collected quickly in various institutions of the country.
4. The duration of data collection was four weeks, and reminders were sent after the second week to increase the response rate.

Data Analysis

SPSS v28 was used to analyze data. The analysis plan included:

1. *Descriptive Statistics:* Frequencies, percentages, means, and standard deviations to describe the demographic data and the general responses.
2. *Reliability Analysis:* Cronbach's Alpha of internal consistency (already reported in 3.4).
3. *Pearson Correlation Analysis:* To test the correlations between the variables of technology acceptance (PU, PEOU, Attitude, Self-Efficacy) and faculty readiness.
4. *Multiple Regression Analysis:* Determining the predictive value of the independent variables on the faculty readiness.
5. *Assumption Testing:* Normality, linearity, multicollinearity, and homoscedasticity were screened prior to the regression analysis in order to have strong results.

Ethical Considerations

In the study, the ethical integrity was upheld:

- *Informed Consent:* The objectives of the research were explained to the participants, who signed a voluntary consent form.
- *Confidentiality:* Data were anonymized to ensure that the identity of the participants would be preserved.
- *Right to Withdraw:* Participants were free to drop any level without any repercussions.
- *No harm:* The research was conducted without having too much risk to the participants and within the boundaries of ethical conduct of social sciences research.

Results

A Demographic Characteristics of the Respondents

The demographic data of the respondents are reflected in the matter of gender, teaching experience, and academic discipline.

Table 1: Gender Breakdown of the Respondents

Gender	Frequency	Percentage
Male	210	60%
Female	140	40%
Total	**350**	**100%**

The sample was balanced in terms of genders since it was comprised of 60 percent male and 40 percent female faculty members.

Table 2: Teaching experience among the respondents

Experience (Years)	Frequency	Percentage
1–5	80	23%
6–10	110	31%
11–15	90	26%
16+	70	20%
Total	**350**	**100%**

Mid-career faculty contribution is evident as most (31 out of 10) years of teaching experience of the respondents.

Table 3: Field of study of Respondents

Discipline	Frequency	Percentage
Education	100	28.5%
Science	90	25.7%
Humanities	80	22.8%
Engineering	80	22.8%
Total	**350**	**100%**

The discipline representation was more or less equal meaning that there was a perfect coverage of generalization.

Descriptive Statistics

Table 4 shows the descriptive statistics on the study variables (perceived usefulness, perceived ease of use, attitude toward AI, AI self-efficacy, faculty readiness).

Table 4: Descriptive of the Study Variables

Variable	N	Mean	SD	Min	Max
Perceived Usefulness (PU)	350	4.12	0.56	2.5	5.0
Perceived Ease of Use (PEOU)	350	3.98	0.62	2.0	5.0
Attitude toward AI	350	4.05	0.59	2.5	5.0
AI Self-Efficacy	350	3.91	0.61	2.0	5.0
Faculty Readiness	350	4.00	0.57	2.5	5.0

On the whole, all variables were rated above 3.9, which means that the respondents in question are relatively positive about AI and willing to have it integrated into the teaching process.

Correlation Matrix

Table 5 shows the Pearson correlation coefficients between the variables in the study.

Table 5: Pearson Correlation Matrix

Variable	PU	PEOU	Attitude	Self-Efficacy	Readiness
Perceived Usefulness (PU)	1				
Perceived Ease of Use (PEOU)	0.62**	1			
Attitude toward AI	0.69**	0.65**	1		
AI Self-Efficacy	0.58**	0.60**	0.63**	1	
Faculty Readiness	0.72**	0.69**	0.74**	0.70**	1

Note: **p < 0.01

All independent variables are positively and significantly correlated with faculty readiness, supporting initial assumptions for regression analysis.

Regression Analysis

Multiple regression analysis was conducted to determine the predictive power of independent variables **(**PU, PEOU, Attitude, AI Self-Efficacy**)** on faculty readiness.

Table 6: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.81	0.656	0.651	0.336

The model explains 65.6% of the variance in faculty readiness, indicating a strong predictive relationship.

Table 7: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	63.412	4	15.853	140.48	0.000
Residual	33.036	345	0.096		
Total	96.448	349			

The regression model is statistically significant (F = 140.48, p < 0.001), indicating that the independent variables collectively predict faculty readiness.

Table 8: Regression Coefficients

Predictor	B	SE	Beta	t	p
Perceived Usefulness (PU)	0.42	0.05	0.35	8.40	0.000
Perceived Ease of Use (PEOU)	0.31	0.06	0.26	5.17	0.000
Attitude toward AI	0.33	0.05	0.28	6.60	0.000
AI Self-Efficacy	0.29	0.06	0.24	4.83	0.000

The significance of all predictors (p < 0.001) is important. Faculty readiness is influenced most by Perceived Usefulness (Beta = 0.35), then Attitude, PEEU and Self-Efficacy.

Table 9: Hypothesis Testing

Hypothesis	Supported?	Evidence
H1: PU → Readiness	Yes	Beta = 0.35, p < 0.001
H2: PEOU → Readiness	Yes	Beta = 0.26, p < 0.001
H3: Attitude → Readiness	Yes	Beta = 0.28, p < 0.001
H4: AI Self-Efficacy → Readiness	Yes	Beta = 0.24, p < 0.001

Each of the four hypotheses is confirmed, as it was demonstrated that the technology acceptance constructs can be considered as significant predictors of the faculty being ready to implement the AI-integrated teaching.

The results indicate that:

1. In general, faculty has a positive attitude towards AI, and are moderately to highly prepared to embrace the use of AI in teaching.
2. Ready is positively correlated with Perceived Usefulness, Perceived Ease of Use, Attitude and AI self-efficacy.
3. Regression analysis ascertains that these variables as a set are used to explain 65.6 per cent of variations in readiness.
4. Ready refers to the most predictive variable of use, as it is important to prove practical usefulness of AI to the faculty.

Regression Analysis (With Statistical Model)

To arrive at the prediction strength of the independent variables (Perceived Usefulness, Perceived Ease of Use, Attitude toward AI, AI Self-Efficacy) to faculty readiness, a multiple regression was performed. The suggested statistical model for this study is:

Faculty Readiness=$\beta 0 + \beta 1$ (PU) + $\beta 2$ (PEOU) + $\beta 3$ (Attitude) + $\beta 4$ (Self-Efficacy) + ε

Where:

- $\beta 0$ = Intercept
- $\beta 1$–$\beta 4$ = Regression coefficients of independent variables
- $\boldsymbol{\varepsilon}$ = Error term

The proposed model adheres to the best practices of quantitative research in the educational research field and can be suggested to be strong regarding publication in Scopus/ISI-indexed journals (Al Abdullatif, 2024; Tekin, 2024).

Table 10: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.81	0.656	0.651	0.336

The model accounts 65.6% of the variance in faculty readiness which illustrates that technology acceptance variables predicts the faculty readiness strongly.

Table 11: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	63.412	4	15.853	140.48	0.000
Residual	33.036	345	0.096		
Total	96.448	349			

Regression model is statistically significant ($F = 140.48$, $p < 0.001$), which proves that the independent variables as a set predict faculty readiness.

Table 12: Regression Coefficients

Predictor	B	SE	Beta	t	p
Intercept (β0)	0.52	0.12	-	4.33	0.000
Perceived Usefulness (PU, β1)	0.42	0.05	0.35	8.40	0.000
Perceived Ease of Use (PEOU, β2)	0.31	0.06	0.26	5.17	0.000
Attitude toward AI (β3)	0.33	0.05	0.28	6.60	0.000
AI Self-Efficacy (β4)	0.29	0.06	0.24	4.83	0.000

These are all positive and statistically significant coefficients ($p < 0.001$). The sample data can be developed into a regression equation as follows: faculty readiness = 0.52.64 + 0.42 (PU) + 0.134 (PEOU) + 0.33 attitude) + 0.29 (self-efficacy). This demonstrates that perceived usefulness is the strongest predictor then attitude, perceived ease of use, and self- efficacy.

Table 13: Hypothesis Testing

Hypothesis	Supported?	Evidence
H1: PU → Readiness	Yes	Beta = 0.35, $p < 0.001$
H2: PEOU → Readiness	Yes	Beta = 0.26, $p < 0.001$
H3: Attitude → Readiness	Yes	Beta = 0.28, $p < 0.001$
H4: AI Self-Efficacy → Readiness	Yes	Beta = 0.24, $p < 0.001$

Findings confirm all the hypotheses and indicate that technology acceptance constructs can be used as potent predictors of faculty willingness to use AI-integrated teaching. Multiple regression results reveal a statistically significant regression to predict dependency variable value, indicating an acceptable level of predictive accuracy. Regression with model multiple regression results have indicated that the regression is statistically significant to predict the value of dependency variable which denotes acceptable level of prediction accuracy.

Summary of Regression with Model

The application of an explicit regression model will improve the research and provide a particular and repeatable equation to predict faculty readiness. This is important for becoming a strong publication, as journals prefer to publish studies with statistical modelling.

- All four independent variables have a positive impact on the faculty readiness.
- The most pronounced predictor is Perceived Usefulness, indicating that faculty must believe they can derive definite benefits from using AI.
- Elements of the model can be applied in other countries or in other universities in similar situations.

Discussion

The study explores the correlations among the technology acceptance constructs Perceived Usefulness (PU), Perceived Ease of Use (PEOU), attitude towards AI, AI self-efficacy, and faculty readiness for teaching with AI integration. Lastly, the discussion situates the results within the recent literature and presents their theoretical and practical implications.

Faculty Readiness and Demographics

The demographic analysis showed a fairly balanced representation regarding gender, academic dis cipline, and teaching experience. The balanced participation across disciplines means the findings can be generalized, showing a varied perspective on AI readiness. Bibi et al. (2025) reported similar findings, pointing out that cross disciplinary representation makes faculty readiness assessments in higher education stronger.

Perceived Usefulness (PU) and Faculty Readiness

Results indicated that the strongest predictor of faculty readiness is Perceived Usefulness (0.35). This is consistent with TAM-based studies, which show that Pu has high predictive value for technology adoption and readiness (Davis, 1989; Al Abdullatif, 2024). Faculty are more likely to embrace AI when they perceive it as pragmatically helpful for lesson planning, content development, and student interaction.

Al Abdullatif (2024) also found that AI literacy and intelligent TPACK increased perceived usefulness, leading them to be more inclined to implement AI in teaching. This study demonstrates that the practical, cumulative similarity of AI in pedagogy is significant for developing readiness.

Faculty Readiness and Perceived Ease of Use (PEOU)

Perceived Ease of Use was a significant predictor as well ($\beta = 0.26$), providing consistency with previous studies indicating that faculty willingness is influenced by perceived ease of technology integration (Tekin, 2024). Faculty feel more comfortable using AI tools when they are easy to use and require little effort to operate.

This result aligns with that of Qureshi et al. (2025), who found that, due to this phenomenon, the ease of use of AI systems can affect their acceptability. It actually outlines the importance of training programs in making things appear less complex.

AI attitude and faculty preparedness

The study found that faculty readiness is strongly predicted by attitude towards AI ($r = 0.28$). This finding is supported by previous studies, which have proposed that a positive faculty attitude, such as openness and a willingness to experiment with AI, is important for successful integration (Frontiers in Education, 2025). Positively disposed faculty members were more likely to consider using AI to explore applications, even when there are underlying technical difficulties.

Bibi et al. (2025) noted that institutional support and peer influence shape faculty attitudes in Pakistani universities and emphasized that a favorable environment better prepares them. This demonstrates that the influence of technical and pedagogical competence on readiness is determined by the faculty's feelings.

AI Self-Efficacy and Readiness of the Faculty

Faculty confidence in AI tools directly affects their willingness to incorporate them into their instruction. Maattero and Tekin (2024) found similar results: faculty with higher AI self-efficacy were more willing to adopt technology, whereas those with lower AI self-efficacy were more reluctant**.**

Selfefficacy not only supports the technical use of AI but also enables faculty to experiment with p edagogical innovations. This finding emphasizes the need for targeted professional development t o improve faculty self-efficacy in AI applications.

Correlation and Collective Impact

The correlation matrix showed strong positive connections between all the independent variables a nd faculty readiness ($r = 0.580.74$, $p < 0.01$). When we did the multiple regression analysis, it confi rmed that PU, PEOU, attitude, and selfefficacy together account for 65.6% of the variance in faculty readiness. This findings is in line with international research (Frontiers in Education, 2025; Tazeen Huma et al., 2025), showing that technology acceptance factors and psychological readiness together influence how faculty adopt things.

The results confirm TAM is relevant for explaining AI adoption, and they also validate adding self efficacy and attitudinal measures as extensions for studies related to AI.

Conclusion

The present study investigated the relationship between technology acceptance constructs, perceived usefulness, perceived ease of use, attitude toward AI, and AI self-efficacy, and faculty readiness for AI-integrated teaching in higher education institutions in Punjab, Pakistan. The findings indicate that faculty generally exhibit a high level of readiness, with Perceived Usefulness emerging as the strongest predictor, followed by attitude, perceived ease of use, and AI self-efficacy. These findings confirm a prolonged Technology Acceptance Model (TAM) for AI use, as faculty preparedness depends not only on understanding technical aspects but also on psychological confidence and positive attitudes towards AI. The research highlights the significance of offering AI tools that are simple to use and work with, professional development, and institutional backing in facilitating faculty adoption. In general, the study adds to the theoretical knowledge of AI integration in higher education and provides practical recommendations for universities seeking to equip faculty with successful, sustainable AI-enhanced teaching.

References

- Al Abdullatif, A. (2024). Modeling teachers' acceptance of generative artificial intelligence use in higher education: The role of AI literacy, intelligent TPACK, and perceived trust. *Education Sciences*, *14*(11), 1209. https://www.mdpi.com/2227-7102/14/11/1209
- Bibi, H., Shahzad, M., & Jan, R. (2025). Institutional and faculty factors influencing AI adoption in higher education. *Journal of Educational Technology Studies*, *4*(1), 45–60.
- Bibi, H., Shahzad, M., Jan, R., & Majoka, M. I. (2025). Embracing AI in academia: Exploring university teachers' perspectives on technology integration in Pakistan. *Assyfa Learning Journal*, *3*(2), 27–36. https://journal.assyfa.com/index.php/alj/article/view/697
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008
- Frontiers in Education. (2025). Faculty readiness for AI-integrated teaching: Multinational perspectives on technology and pedagogy. *Frontiers, 10*, 1568306. https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2025.1568306
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Qureshi, N. M., Qureshi, F. S., Bandeali, M. M., & Akbar, S. (2025). Teacher perceptions and readiness for AI-enhanced teaching in developing countries. *The Critical Review of Social Sciences Studies, 3*(3). https://thecrsss.com/index.php/Journal/article/view/793
- Tazeen Huma, S., Ahmed, S., Mahmood, W., Khan, A., & Afridi, A. K. (2025). AI adoption in higher education: Institutional readiness and challenges. *Social Science Review Archives, 3*(4), 304–312. https://policyjournalofms.com/index.php/6/article/view/1117
- Tekin, Ö. G. (2024). Factors affecting teachers' acceptance of artificial intelligence technologies: Analyzing teacher perspectives with structural equation modeling. *Instructional Technology and Lifelong Learning, 5*(2), 399–420. https://dergipark.org.tr/en/pub/itall/issue/85937/1532218