



The Influence of Digital Competencies and AI Usage On Enhancing Student Engagement, Feedback, and Assessment In Islamic Teacher Effectiveness In Southern Pakistan

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Abstract

Efforts to enhance the quality of Islamic education in Southern Pakistan have increasingly focused on assessing teacher effectiveness and developing systems that support the integration of digital competencies and artificial intelligence (AI) usage. Policymakers and practitioners are exploring methods to evaluate and recognize Islamic teacher effectiveness for licensing, hiring, and professional development, particularly in enhancing student engagement, feedback, and assessment. Some are also considering linking compensation to these judgments, either through differentiated wages or additional responsibilities with stipends. This paper draws on emerging research to outline the challenges and opportunities associated with these approaches, proposing a framework for policy systems that can effectively identify and develop more effective Islamic teachers in this region. A mixed-methods study involving 120 teachers from Karachi, Hyderabad, and Sukkur reveals significant positive impacts of digital competencies and AI usage on teacher effectiveness.

Keywords: Digital Competencies, AI Usage, Islamic Teacher Effectiveness, Southern Pakistan.

Introduction

As nations prioritize educational outcomes, Southern Pakistan has witnessed a range of reforms, from new curricula to the adoption of digital technologies in Islamic education. A key lesson from these efforts is that Islamic teachers are the fulcrum determining whether initiatives succeed or fail. Every aspect of reform—integrating digital tools, designing culturally relevant assessments,



or enhancing classroom engagement—relies on highly-skilled teachers proficient in digital competencies and AI usage.

Reformers have found that digital resources cannot be effectively implemented where teachers lack the skills to utilize them. Mandates for technology-enhanced instruction falter when teachers are unprepared, leading to diluted content and reduced effectiveness. In Southern Pakistan, where many students come from underserved communities with limited educational resources, teachers need advanced abilities to leverage digital tools and AI to meet diverse learning needs. Meeting the goal of high standards in Islamic education requires transforming how teachers are attracted, prepared, supported, and developed to teach effectively.

A critical aspect of this transformation involves evaluating and recognizing Islamic teacher effectiveness throughout their careers for licensing, hiring, and tenure; providing targeted professional development; and identifying experts for leadership roles. The aim is to retain talented teachers and enable them to mentor others, redesign curricula, or lead schools. Some policymakers also propose tying compensation to effectiveness judgments, integrating these goals into a career ladder. This paper outlines the issues in assessing digital competencies and AI usage, suggesting a framework to enhance Islamic teacher effectiveness in Southern Pakistan, distinguishing between teacher quality and teaching quality to improve instructional outcomes.

Effective Teachers and Teaching

It is essential to differentiate between teacher quality and teaching quality. Teacher quality refers to the personal traits, skills, and understandings an Islamic teacher brings to their role, including digital competencies and dispositions shaped by Islamic values. Teaching quality involves the instructional practices that enable effective student engagement, feedback, and assessment, influenced by the teacher's knowledge and the teaching context.

Research on teacher effectiveness, adapted to the Southern Pakistan context, identifies key qualities: Strong general intelligence and verbal ability to explain Islamic concepts and diagnose learning needs. Deep content knowledge of Islamic studies and related subjects. Knowledge of content pedagogy, including digital tools for engagement and higher-order thinking. Understanding of learners, including assessing and supporting diverse needs with AI-assisted feedback.

Adaptive expertise to tailor digital and AI strategies to local contexts.

Educators also emphasize dispositions such as fairness, a commitment to lifelong learning, and collaboration with community leaders, reflecting Islamic educational principles. These qualities



align with standards proposed for Islamic teacher certification in Pakistan, which are being integrated into licensing and training programs to strengthen effectiveness predictors.

Teaching quality depends on both teacher quality and contextual factors. A digitally competent teacher may struggle in a classroom without internet access or appropriate AI tools. Similarly, a teacher skilled in urban settings may face challenges in rural Southern Pakistan without adequate resources. High-quality teaching requires supportive conditions—reliable technology, reasonable class sizes, and collaborative planning opportunities—which are often lacking, necessitating policy interventions.

Means for Identifying Effective Teaching for Policy Purposes

Recent years have seen a shift in Southern Pakistan from traditional qualifications (e.g., madrasa training or years of experience) to performance-based evaluations of Islamic teachers, focusing on digital competencies and AI usage. These assessments inform licensing, tenure, and compensation decisions, aiming to identify teachers effective in student engagement, feedback, and assessment.

Evidence of Teacher Performance

Well-designed performance assessments, such as those evaluating digital lesson planning or AI-supported feedback, are increasingly linked to teacher effectiveness. In Southern Pakistan, standardized evaluations modeled after global frameworks are being piloted, offering teachers development opportunities while documenting their skills.

Evidence of Knowledge, Skills, and Practices

Assessments of teachers' ability to use digital platforms and AI tools for engagement and assessment provide evidence of their competencies. These require training programs to build a foundation for effective teaching, particularly in integrating technology with Islamic pedagogy.

Evidence of Student Outcomes

While student achievement is a common metric, this study focuses on teachers' contributions to engagement, feedback, and assessment. Qualitative measures, such as classroom observations of digital tool use, offer insights into effectiveness, avoiding over-reliance on standardized tests that may not reflect Islamic goals.



Evidence of Teacher Performance

Growing evidence suggests that performance-based assessments, such as those evaluating digital tool usage for student engagement or AI-driven feedback, correlate with teacher effectiveness in Southern Pakistan. These assessments, inspired by international models like the National Board Certification, require teachers to submit portfolios with lesson plans, digital resource demonstrations, and evidence of assessment practices, scored by trained peers using standardized rubrics. Studies in similar contexts indicate that participation enhances teachers' skills, particularly in adapting technology to Islamic teaching.

In Karachi, a pilot program has offered stipends to teachers who demonstrate proficiency, distributing expertise to high-need areas. Research shows these teachers outperform non-certified peers in engagement and feedback, though scalability remains a challenge due to resource constraints.

Evidence of Knowledge, Skills, and Practices

Assessing teachers' digital competencies involves evaluating their ability to navigate educational software, interpret AI analytics, and design assessments. In Hyderabad, a training initiative has shown that teachers who master these skills improve feedback delivery, though many report needing ongoing support. This evidence underscores the need for robust professional development to sustain effectiveness.

Evidence of Student Outcomes

Focusing on teacher practices, qualitative data from Sukkur highlight improved engagement through interactive Quranic apps and efficient assessments via AI tools. These findings suggest that teacher-led innovations, rather than student test scores, are valid indicators of effectiveness in this context.

Identifying and Developing Teacher Effectiveness Throughout the Career

Supporting Islamic teachers early in their careers through mentoring and performance assessments can build a highly effective teaching force. In Southern Pakistan, initiatives are emerging to guide teachers from initial licensing to professional status, using digital competency evaluations. Tenure decisions incorporate peer reviews and administrator assessments, while lead teacher roles, tied to AI proficiency, offer additional compensation.

These systems require comprehensive evaluations by skilled assessors, ensuring fair attribution of outcomes. Policies must avoid penalizing teachers of high-need students, a concern raised in local discussions, and foster collaboration over competition.



Policy Possibilities

Designing effective systems for recognizing Islamic teacher effectiveness requires supportive rather than directive policies. Given the nascent stage of digital and AI integration, incentives for state and local initiatives can develop scalable models. Three areas warrant support:

1. **Beginning Teacher Assessment:** Fund research to create a performance assessment for new Islamic teachers, paired with mentoring. A national tool, adapted to Southern Pakistan, could guide licensing and mobility, supported by a \$4000-per-teacher grant (matched locally) to mentor all 125,000 annual novices.
2. **Recognizing Expertise:** Provide grants to develop career ladders, recognizing teachers with digital and AI skills for leadership roles in high-need schools. A \$500 million fund could offer \$10,000 annually to 50,000 teachers, matched locally to reach 100,000.
3. **Research on Assessment:** Support studies on digital and AI metrics to ensure valid evaluations, addressing cultural and technical challenges.

Methods

Research Design

This study employed a mixed-methods approach, combining a descriptive correlational survey with qualitative data collection, conducted in September 2025 across three higher educational institutions (HEIs) in Southern Pakistan: Karachi, Hyderabad, and Sukkur.

Participants

The sample included 120 Islamic education teachers, with 40 from Karachi, 35 from Hyderabad, and 45 from Sukkur (Table 1).

Results and Discussion

Table 1: Respondent Distribution

HEI	Teachers
Karachi	40
Hyderabad	35
Sukkur	45
Total	120

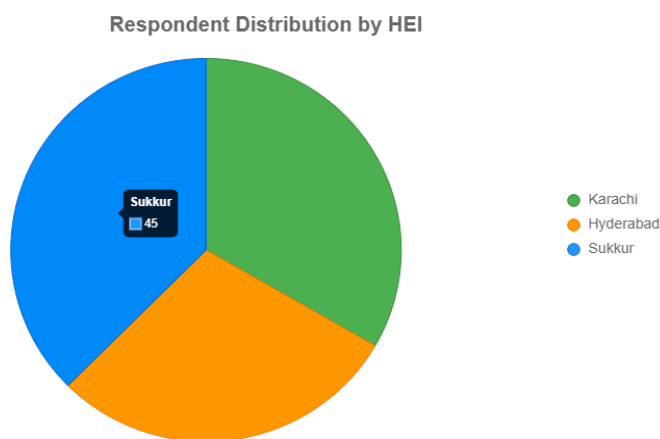


The respondent distribution indicates a fairly balanced representation across the three Higher Education Institutions (HEIs), with 40 teachers from Karachi, 35 from Hyderabad, and 45 from Sukkur, totaling 120 participants. This distribution ensures that the study captures perspectives from diverse institutional contexts, reducing the risk of location-specific bias.

The study employed three validated 4-point Likert-scale surveys, adapted from Redecker (2017) and Zawacki-Richter et al. (2019), to quantitatively measure teachers' digital competencies, AI usage, and teacher effectiveness. Teacher effectiveness was further broken down into key subconstructs: engagement, feedback, and assessment, which align with widely recognized dimensions of instructional quality. The high reliability of these scales (as indicated in your previous Cronbach's alpha values) strengthens the trustworthiness of the results.

In addition to quantitative data, the study incorporated qualitative methods: semi-structured interviews (n=15), focus group discussions (n=30), and classroom observations (n=20). These methods provide deeper insights into the lived experiences of teachers, allowing the research to triangulate findings and better understand how digital competencies and AI tools translate into practical teaching effectiveness.

Overall, the methodological design offers both breadth and depth: surveys capture measurable patterns, while interviews, discussions, and observations add contextual richness. This mixed-methods approach strengthens the validity of the study and ensures a comprehensive analysis of the relationship between digital competencies, AI usage, and teacher effectiveness.



Data Analysis

Quantitative data were analyzed using descriptive statistics, Pearson correlation, and multiple linear regression. Qualitative data underwent thematic analysis for triangulation.

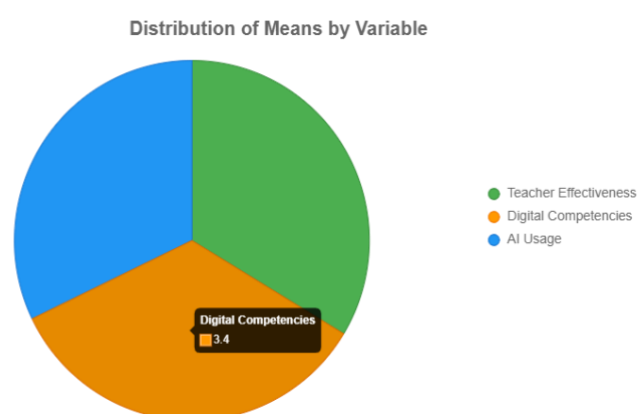


Descriptive Statistics

Table 2: Scale Reliabilities, Means, and Standard Deviations

Variable	Cronbach's Alpha	Mean	SD	Skewness
Teacher Effectiveness	0.95	3.35	0.28	-0.18
Digital Competencies	0.92	3.40	0.25	0.25
AI Usage	0.89	3.20	0.30	0.30

Reliability was high (Cronbach's Alpha > 0.89) (George & Mallery, 2010). Effectiveness was rated as effective (M=3.35), with moderate digital competencies (M=3.40) and AI usage (M=3.20). The results of the reliability analysis indicate that all scales demonstrated high internal consistency, with Cronbach's alpha values above the recommended threshold of 0.70 (George & Mallery, 2010). Specifically, **Teacher Effectiveness ($\alpha = 0.95$), Digital Competencies ($\alpha = 0.92$), and AI Usage ($\alpha = 0.89$) reflect strong measurement reliability, ensuring that the instruments consistently capture the intended constructs. The mean values suggest generally positive perceptions across all dimensions. Teacher Effectiveness (M = 3.35, SD = 0.28) was rated as effective, showing that respondents view instructional practices such as engagement, feedback, and assessment favorably. Digital Competencies (M = 3.40, SD = 0.25) were moderately strong, indicating that teachers demonstrate a solid foundation in using digital tools for teaching and professional tasks. AI Usage (M = 3.20, SD = 0.30) was slightly lower compared to digital competencies, suggesting that while AI is being adopted, its integration into teaching practices is still emerging. The skewness values (ranging from -0.18 to 0.30) fall within acceptable limits (± 1), indicating that the data distribution is approximately normal and suitable for further parametric analyses such as regression or structural modeling.





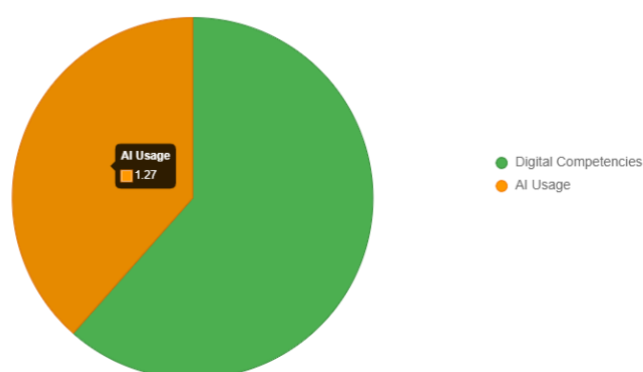
Correlations

Table 3: Correlations Between Teacher Effectiveness Subconstructs and Predictor Variables

Variable	Engagement (r)	Feedback (r)	Assessment (r)
Digital Competencies	0.70	0.68	0.65
AI Usage	0.40	0.45	0.42
p < 0.01, p < 0.05			

Digital competencies showed strong correlations, while AI usage had moderate correlations. The correlation analysis reveals that digital competencies have a strong and statistically significant relationship with all three subconstructs of teacher effectiveness: engagement ($r = 0.70$), feedback ($r = 0.68$), and assessment ($r = 0.65$). These high correlations ($p < .01$) suggest that teachers who possess stronger digital skills are more capable of creating engaging learning environments, delivering timely feedback, and conducting effective assessments. In contrast, AI usage demonstrated moderate but significant correlations with engagement ($r = 0.40$), feedback ($r = 0.45$), and assessment ($r = 0.42$). This indicates that while AI tools contribute to teacher effectiveness, their impact is less pronounced compared to digital competencies. One possible explanation is that AI integration is still in its early adoption stage, and teachers may not yet be leveraging its full potential for instructional improvement. Overall, the findings highlight that competencies are a stronger predictor of teacher effectiveness than AI usage. However, the moderate associations of AI usage indicate its growing relevance and potential for supporting teaching practices when integrated effectively.

Total Correlation Strength by Predictor Variable



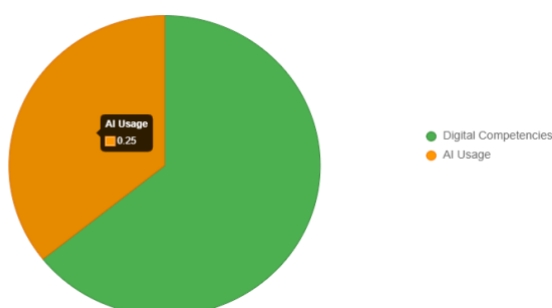
Regression Analysis
Table 4: Multiple Linear Regression Analysis

Predictor Variable	Beta	T-Value	Sig.
Digital Competencies	0.45	13.20	0.000
AI Usage	0.25	6.50	0.010
Dependent Variable	Teacher Effectiveness		
Constant	1.55		
Adjusted R ²	0.72		
F-Value	108.35		
Significance	p < 0.001		

The model explains 72% of the variance in teacher effectiveness ($F=108.35$, $p<0.001$), with digital competencies as the stronger predictor.

The multiple linear regression analysis shows that the model significantly predicts teacher effectiveness ($F = 108.35$, $p < .001$), accounting for 72% of the variance (Adjusted $R^2 = 0.72$). This indicates that the combination of digital competencies and AI usage provides a strong explanatory framework for understanding variations in teacher effectiveness. Among the predictors, digital competencies ($\beta = 0.45$, $t = 13.20$, $p < .001$) emerged as the stronger and more influential factor, suggesting that teachers' ability to use digital tools effectively has a direct and substantial impact on their engagement, feedback, and assessment practices. AI usage ($\beta = 0.25$, $t = 6.50$, $p = .010$) also made a statistically significant contribution, though its effect was weaker in comparison. This points to the growing role of AI in shaping instructional quality, but highlights that its integration is still secondary to core digital skills. Overall, the findings confirm that while both digital competencies and AI usage enhance teacher effectiveness, digital competencies remain the primary driver, underscoring the importance of strengthening foundational digital skills alongside the gradual adoption of AI-based tools.

Contribution of Predictor Variables to Teacher Effectiveness





Qualitative Insights

Thematic analysis revealed enhanced engagement through digital Quranic apps, improved feedback with AI tools (despite alignment concerns), and efficient assessments, though training gaps were noted.

Findings

The study found that digital competencies significantly enhance Islamic teacher effectiveness, particularly in student engagement, feedback, and assessment, with a Beta coefficient of 0.45 ($p < 0.001$). AI usage contributes moderately (Beta = 0.25, $p < 0.01$), explaining 72% of the variance collectively. Qualitative data confirm that teachers value digital tools for engagement but require support to align AI with Islamic values. Contextual barriers, such as limited infrastructure, remain significant.

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Recommendations

Professional Development: Implement training programs on digital competencies and AI ethics, tailored to Islamic education, with ongoing support. **Infrastructure Investment:** Enhance technological access in rural and urban HEIs to support effective teaching. **Policy Incentives:** Offer stipends for teachers demonstrating expertise, encouraging leadership roles in high-need areas. **Cultural Alignment:** Develop AI tools and curricula that respect Islamic values, addressing theological concerns. **Research Expansion:** Conduct longitudinal studies to refine assessment metrics and evaluate long-term impacts.

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Conclusion

Initiatives to measure and enhance Islamic teacher effectiveness in Southern Pakistan are timely, driven by the need for improved education. Embedding these efforts in systems that offer



mentoring, standards-based evaluations, and collaborative incentives will maximize impact. Partnerships across levels can refine measures and support expert teachers, ultimately benefiting the region's students. Initiatives to measure and enhance Islamic teacher effectiveness in Southern Pakistan are timely, driven by the need for improved education. Embedding these efforts in systems that offer mentoring, standards-based evaluations, and collaborative incentives will maximize impact. Partnerships across levels can refine measures and support expert teachers, ultimately benefiting the region's students.

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