

THE RURAL-URBAN DIVIDE IN DIGITAL READINESS FOR AI INTEGRATION: A QUALITATIVE STUDY OF PAKISTANI TEACHERS' PERSPECTIVES

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Abstract

The integration of artificial intelligence (AI) in education has created a wave worldwide but the digital readiness of teachers to adopt artificial intelligence practices is uneven especially in a developing context. This qualitative research focuses on the rural-urban gap in digital readiness of teachers for the integration of AI in education of schools in Pakistan. The study used a qualitative descriptive design by using eight focus group discussions with public, private-school teachers from rural and urban. Data were analysed thematically in line with the approach of Braun and Clarke (2006). The findings uncover five themes related to the readiness of teachers to AI integration: (1) uneven understanding of AI, (2) infrastructure as the main gatekeeper, (3) digital skills as an access rather than motivation factor, (4) psychological and ethical readiness, and (5) development in the form of a gap. Urban private-school teachers revealed greater degrees of conceptual clarity, infrastructural support and professional confidence whereas rural public-school teachers were faced with basic barriers such as unreliable electricity, lack of internet access and lack of relevant training. The results of the study conclude that the readiness of teachers for integrating AI is a multidimensional construct that is influenced by structural, institutional and sociocultural factors and not limited to individual capability alone.

INTRODUCTION

Artificial intelligence (AI) is transforming the educational processes around the world, affecting the design of instruction, evaluation, feedback systems, and management decision-making (Luckin, 2025). Adaptive learning systems and other AI-based tools are encouraged as the means of improving personalization, efficiency, and equity in education (Adiguzel et al., 2023). Although the global discourse has focused a lot on transformative opportunities of AI, its successful implementation in the classroom setting is still unequal and strongly reliant on contextual factors.

The digital preparedness of teachers to adopt AI is not limited to simple technological literacy (Lucas et al., 2025). It includes abstract knowledge of AI, availability of trustworthy infrastructure, institutional and professional assistance, trust in digital prowess, and ethical and psychological attitudes to the use of technology. Previous studies have indicated that even the most carefully developed educational technologies do not result in any significant change without proper preparedness of teachers to embrace and transform them into their teaching environments.

As a result, the views of teachers have become one of the most important lenses to determine the facts about the implementation of AI in education.

Structural inequalities in the education system are other threats to the adoption of AI in developing countries like Pakistan (Ahmed, 2024). The historical rural-urban disparity in infrastructure, opportunities in professional development, and institutional resources still defines the quality of education and innovations. Urban schools, especially in the private sector, have the advantage of constant electricity, the Internet, and access to new technologies, and many rural schools cannot afford even the minimum functioning conditions. These inequalities influence some critical questions regarding whether AI implementation can potentially contribute to the further amplification of existing educational inequalities instead of reducing them.

Although there is increasing literature on AI in the education field across the globe, empirical studies on the readiness of teachers in Pakistan towards the integration of AI are still minimal. The literature in the area has generally focused on technological availability or policy level aspirations as well as ignoring the lived experiences of teachers, contextual limitations, and considerations of value. The rural-urban disparities are often considered as the background variables instead of being studied as the multidimensional phenomenon that is influenced by the infrastructure, institutional culture, gendered schooling conditions, and socio-cultural expectations. Qualitative studies on the conceptualization of AI by teachers and the way they understand its applicability in their classrooms across a variety of schools are lacking. The current research evaluates the rural-urban divide in digital preparedness to integrate AI using a qualitative analysis of the views of Pakistani teachers. Based on focus group interviews with teachers in rural and urban settings in both public and private schools, the study examines the role of conceptual knowledge about AI, infrastructural factors, digital literacy, psychological and ethical attitudes, and professional growth opportunities in determining readiness to adopt AI. Instead of

putting rural-urban differences in the context of mere deficits, the research takes a contextual view, which brings out structural constraints, adaptive practices, and value-based reactions across environments.

This research will help to create a clearer picture of AI preparedness in education in a developing-country setting because it foregrounds the voices of teachers. It is expected that the findings will be used to inform the policy debate, teacher education programs, and school-level planning by showing when AI integration will be possible, significant and fair. The work answers an increasing demand of the context-sensitive, teacher-oriented research on the implementation of educational technologies in the Global South.

2. Background of the study

Artificial intelligence (AI) is transforming education across the world with such tools as adaptive learning systems and automated feedback, which attempt to enhance personalization and efficiency. Nevertheless, digital preparedness of teachers can facilitate a successful integration process in classrooms (Nabi et al., 2025). International research indicates that the lack of equal adoption is due to the deficiencies in preparation of teachers, even though AI is pushed in terms of instruction and assessment (Fu et al., 2024).

Preparedness of teachers extends beyond technical skills and expertise in AI to cover knowledge of AI concepts, trustworthy access to technology, school support, comfort working with digital features, and ethical perceptions towards technology. It has been pointed out that even powerful AI tools cannot work unless teachers can adjust them to actual classrooms (Nazaretsky et al., 2022). Aspects such as AI fear and insufficient education are barriers to efficient utilization, which require special professional courses and codes of ethics (Hopcan et al., 2024).

Infrastructure, training, and resource disparities in rural and urban areas of countries such as Pakistan make the implementation of AI in schools difficult. The urban private schools are typically stable in terms of power, internet, and tech, whereas the rural public ones experience simple

deficits that contribute to inequality (Lipman, 2024). These gaps raise the question of whether AI will be beneficial or detrimental to equity because rural teachers do not have access to the tools used by urban ones without difficulties (Ahmed, 2024). Artificial Intelligence research in education is also usually based on access to technology or policies, but it does not cover actual experience of teachers and rural-urban specifics in Pakistan. Not many investigate the influence of infrastructure, school culture, gender, and social norms on the perception of AI (Qayyum et al., 2024). The qualitative work is uncommon, lacking the personal ideas of the teachers about AI ethics and classroom suitability across the settings (Yaman and Başaran, 2025).

The gap is closed by this research that qualitatively examines the rural-urban variance of AI readiness among Pakistani teachers via focus groups of both public and private schools. It explores AI knowledge, infrastructure, skills, and ethics, attitudes, and training requirements without regarding rural as simply deficient of (Mokoena and Seeletse, 2025). The results reveal adaptive mechanisms and structural constraints to shape equitable AI applications.

The study focuses on the opinions of the teachers, hence providing information within the scope of policies, training, and school plans in the developing countries. It emphasizes the requirements of fair AI, which concurs with demands of teacher-based research in the Global South.

3. Statement of the Problem

The development of AI in the education sector has created high expectations in enhancing the efficacy of teaching, learner-centric learning, and educational performance. Nevertheless, the advantages are strongly contingent on how digitally prepared teachers are to learn, embrace, and implement AI tools in classroom activities (Ngongpah & Oni, 2025). Such readiness in systems characterized by inequality cannot be presupposed to be homogeneous.

Rural-urban inequalities in infrastructure, institutional support, and professional development can persist in Pakistan and influence

the deployment of digital technologies by teachers (Khan, 2024). Despite the fact that most policy discourse favours digital innovation, most schools (particularly in the rural parts of the country) have to contend with more fundamental problems such as unreliable electricity, limited network connectivity, and lack of technological infrastructure. Consequently, AI programs are at the risk of becoming urbanized, which further solidifies existing inequalities.

Current studies on AI in Pakistan have largely been based on the access to technology, policy readiness, or student performance (Asad & Memon, 2025). Little focus has been given on the experiences, perceptions and challenges of teachers. The knowledge of AI, the level of confidence in digital skills, ethical issues, and the situational limitation of teachers is not fully investigated, especially in the form of qualitative research.

The gap is that there is no empirically based, teacher-oriented knowledge of AI preparation in Pakistan in the rural and urban school settings. Without such knowledge, AI efforts can never be relevant to classroom realities, and thus there will be unequal adoption and low instructional effects (Qayyum et al., 2024).

4. Significance of the Study

The research has implications at policy, institutional, and scholarly levels because it provides a context-specific insight into how teachers are digitally prepared to integrate AI into education in Pakistan. It avoids technology-centred narratives by focusing on views of teachers in both rural and urban schools by placing them at the centre and emphasizes structural, cultural and professional issues that affect the uptake of AI. To policymakers, the results can offer empirical data to understand the role of rural-urban disparities on AI preparedness and why equity-based digital educational policies should be implemented. To teacher educators and school administrators, the study reveals the gaps in the professional development, infrastructure, and other aspects of the institution that need to be met to facilitate effective integration into AI.

On the scholarly level, the research adds to a deficiency of qualitative researches in the area of AI in education in developing settings. It demonstrates that digital readiness is a multidimensional construct, which is defined by the access, exposure, values, and lived experience. The results also contribute to the future teacher-focused research and prepare context-related technological interventions instead of technology-based ones.

5. Research Objectives

The objectives of the study included the following:

1. To investigate the perception and conceptual beliefs of Pakistani teachers toward AI in the teaching process.
2. To analyse the factors that determine the digital preparedness of teachers to integrate AI in rural and urban schools.
3. To examine the influence of institutional and infrastructural factors on the readiness of teachers to use AI-based tools.
4. To determine the psychological, ethical, and cultural orientations of teachers to the application of AI in the classroom.
5. To understand teacher perceived needs of professional development and support in integrating AI effectively and fairly.

6. Research Questions

The research questions in the study included the following:

1. What is the perception and conceptualization of AI in education to Pakistani teachers?
2. What are the factors that determine the digital preparedness of teachers in rural and urban settings to adopt AI?
3. What are the effects of institutional and infrastructural factors on the willingness of teachers to use AI-based tools?
4. What are the psychological, ethical, and contextual issues related to the integration of AI in the classroom among teachers?
5. What are the training and professional support requirements of teachers, in order to effectively and equitably use AI?

7. Methodology

In this study, a qualitative and exploratory design is used to investigate the digital preparedness of teachers in rural and urban schools in Pakistan regarding the adaptation of artificial intelligence. A qualitative orientation was deemed suitable since the research is aimed at capturing subjective meanings, contextual experiences, and interpretive meanings of teachers and not to measure predefined variables or test hypotheses.

7.1 Research Paradigm and Philosophical Orientation

The paper is placed in an interpretivist qualitative paradigm in which reality is social and is best interpreted through the meanings of individuals. In this perspective, the digital preparedness of teachers to integrate artificial intelligence (AI) is not an essential characteristic but a situational phenomenon that is conditioned by the factors of the institution and its experience and shaped by the actual values of the sociocultural context.

Philosophically, the work is based on constructivist epistemology, according to which knowledge is formed as a result of the interaction between the researcher and the participant. The knowledge of AI among teachers, their perceptions of preparedness, and anxieties were regarded as legitimate situated knowledge as opposed to technical deviations. The study is ontologically relativist and recognizes the presence of various realities that are influenced by the rural-urban context, school sector, and gendered environments.

Methodologically, it is an inductive sort of a qualitative stance where themes are presented through the narration of participants. The researcher took an interpretative role with the objective of representing the views of the teachers with consideration of the contextual effects. Reflexivity was preserved through the acknowledgment of the researcher as both educator and technologist and by not making judgemental or deficit-based interpretations, especially of the responses of the rural teachers.

7.2 Research Design

The qualitative descriptive design was employed to investigate the views of teachers on the digital readiness to the integration of AI within the context of diverse schools. This design has facilitated comprehensive analysis of perceptions, experiences and contextual realities without simplifying them into numerical values. The primary data collection method was the focus group discussions (FGDs), which facilitates interaction, mutual reflection and articulation of common meanings.

The design was conducive in analysing common issues of concern and contextual variations between rural and urban schools without categorizing or offering causal reasons. Contextual lenses were employed on rural-urban location, school sector, and gendered school settings instead of analysing them as analytical variables.

7.3 Population and Sample

The study population included teachers in both rural and urban public and private schools of Pakistan. The unit of analysis was chosen to be teachers because they are the key stakeholders in adopting and implementing digital and AI-based technologies in classrooms. They are the informants because they are involved in instruction, assessment and interact with students and therefore are central in finding out AI readiness in the schools.

The stratified purposive sampling was implemented to cover the teachers representing

varied institutional and sociocultural backgrounds. This method was appropriate to the qualitative inquiry as it allowed picking up information rich cases that provide in-depth understanding of the phenomenon. In Pakistan, stratification was determined by factors that defined access to digital and professional opportunities such as school location, sector and gendered schooling environments. The focus was not on the statistical representation but on the differences in the experiences of teachers and their perception of AI readiness.

These strata were specifically selected with eight schools chosen, and teachers in each school were invited to participate in focus group discussions. The participation was voluntary and contingent on availability and willingness and the eligibility criteria were that the participants should be currently teaching and have a minimum exposure to digital tools in instructional or administrative practice. All subject teachers were included because AI readiness was considered as an interdisciplinary professional problem.

Eight focus group discussions were incorporated in the final sample, four in urban schools and four in rural schools. The number of participants was between three and six groups, which equalled to 37 teachers in total. This was a suitable sample size, which allowed meaningful group interaction and saturation of the themes against the contexts, and the diversity of the participants made the findings more credible.

Table 1. Focus Group Structure

Group ID	Group Description	No of Participants	Participants' ID
FG1(UGB)	Teachers of a public school for boys in an urban area	6	UGB-1, UGB-2, UGB-3, UGB-4, UGB-5, UGB-6
FG2(UGG)	Teachers of a public school for girls in an urban area	4	UGG-1, UGG-2, UGG-3, UGG-4
FG3(UPB)	Teachers of a private school for boys in an urban area	5	UPB-1, UPB-2, UPB-3, UPB-4, UPB-5
FG4(UPG)	Teachers of a private school for girls in an urban area	6	UPG-1, UPG-2, UPG-3, UPG-4, UPG-5, UPG-6
FG5(RGB)	Teachers of a public school for boys in a rural area	5	RGB-1, RGB-2, RGB-3, RGB-4, RGB-5

FG6(RGG)	Teachers of a public school for girls in a rural area	4	RGG-1, RGG-2, RGG-3, RGG-4
FG7(RPB)	Teachers of a private school for boys in a rural area	4	RPB-1, RPB-2, RPB-3, RPB-4
FG8(RPG)	Teachers of a private school for girls in a rural area	3	RPG-1, RPG-2, RPG-3

7.4 Instrumentation

A semi-structured focus group discussion guide was created to collect data in this study. The guide was created to generate deep and context-based descriptions of teacher digital preparedness to integrate AI. It consisted of open-ended questions in a logical sequence and started with general thoughts about the use of technology and progressively led to more specialization possible on the topics of AI-related knowledge, abilities, future attitudes, institutional backing, ethical issues, and career development requirements.

Technical definitions of AI were avoided to make sure that responses were based on the conceptualizations of participants rather than the interpretation of the researcher. The probing questions were applied with flexibility to enhance discussions and be neutral yet avoid leading questions.

The discussion guide has been expert validated by the reviewers experienced in qualitative research, educational technology and education policy before data collection. The instrument was found to be clear, relevant and contextually appropriate as stated by feedback. One of the small amendments concerning conceptual labelling of professional development was added before the final implementation.

7.5 Data Collection Procedure

The face-to-face focus group discussions were conducted in an environment that the participants are used to, which means a school meeting room, to encourage the participants to be relaxed and discuss freely. All the focus groups took around 60-75 minutes and were guided by the researcher.

At the start of every session, the participants were oriented on the objective of the research, ethics and rules of discussion. Audio recording was done with informed consent. The moderator helped in the balanced participation, respectful interaction

and was attentive to contextual and gender-related dynamics in groups. All the focus groups used the same discussion guide to ensure uniformity in the discussion but give flexibility in elaborating on context-specific matters.

7.6 Data Analysis Procedure

Data analysis followed the framework for thematic analysis suggested by Braun and Clarke (2006). Audio recordings were transcribed verbatim and transcripts were read numerous times to obtain familiarization. Initial coding was inductive and meanings and patterns were emerging directly out of the accounts of participants.

Codes were then reviewed, refined and grouped into broader themes that represented both shared perceptions and contextual differences in digital readiness for AI integration. Attention was given to the identification of convergences and contrasts between rural and urban, without imposing any comparative assumptions. Themes were reviewed repeatedly in order to ensure coherence and clarity of distinction within. Representative quotations were used to provide examples of important analytic insights and maintain the views of the participants.

7.7 Ethical Considerations

Ethical principles were taken very seriously during the study. Participation was voluntary and informed consent was obtained from all the participants before the data were collected. Participants were told that they could withdraw at any time from the study without penalty.

Confidentiality and anonymity were ensured by assigning coded identifiers to participants and not including any personally identifiable information in transcripts and reports. Audio recordings and transcripts were stored securely, and only accessible by the researcher. Data were used for purely academic research purposes and findings

were presented in such a way that respect the dignity of participants and sensitivity to their context.

8. Data Analysis

The focus group data were analysed using thematic analysis based on the approach developed by Braun and Clarke (2006). Audio recordings were transcribed verbatim and the transcripts read repeatedly to familiarize with the data. Initial coding was done inductively so that patterns and meanings developed directly from the account of participants, rather than imposing meanings or

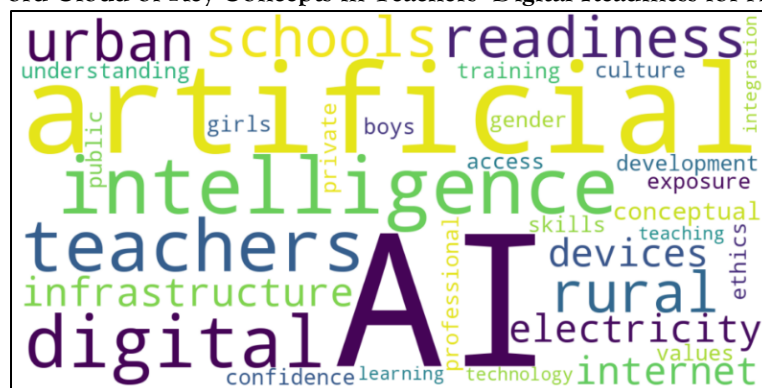
patterns as they emerged from the accounts. Codes were then reviewed, refined and grouped into broader themes that represented common perceptions as well as contextual variations in digital readiness among teachers for the integration of artificial intelligence. Attention was given to discerning convergences and contrasts in different school settings, and the forced comparison of rural and urban settings was avoided. Themes were reviewed iteratively and the coherence and distinction among themes, as well as representative quotations to illustrate key analytic insights were selected.

Table 2. Summary of Themes and Illustrative Evidence about Digital Readiness for Integration of AI

Theme	Urban Context (Illustrative Evidence)	Rural Context (Illustrative Evidence)
Theme 1: Uneven Conceptualization of AI Shapes Readiness	The urban teachers of private schools explained AI as a functionality of pedagogy, e.g. adaptive learning and automated assessment: <i>"AI assists us to make learning adaptive to particular students; the system will make things harder or easier on its own"</i> (UPB-1). The partial awareness of urban public teachers was demonstrated by the media: <i>"AI is virtual tutors or chatbots, and we have not used it in the right way"</i> (UGB-1).	The abstract or symbolic interpretations utilized by rural public teachers were: <i>"AI is like magic computers that resolve problems independently"</i> (RGB-1). There was the emergent knowledge of rural private teachers through mobile exposure: <i>"I had a free AI app on my phone to get math examples"</i> (RPB-1).
Theme 2: Infrastructure Acts as the Primary Gatekeeper of AI Integration	Urban private schools said that there was good infrastructure: <i>"The infrastructure is good (has fibre internet, and IT team) and there is no issue with running AI pilots"</i> (UPB-4). There were challenges in the systems of urban public schools: <i>"Internet is not always reliable, and AI tools do not always work"</i> (UGG-1).	Public schools in rural areas had almost no infrastructure: <i>"There is no electricity most days, so it is not necessary to speak about AI anymore"</i> (RGG-1). The rural private schools were based on the little solar and mobile systems: <i>"Solar panels can be used to do some AI, but power outages freeze everything"</i> (RPB-4).

Theme 3: Digital Skills Are Shaped by Access Rather Than Motivation	The competence of urban private teachers was high: "Installing AI will demand high-level prompting and integration of LMS, and we are comfortable with it" (UPB-1). City education public teachers were moderately confident: "We are able to work with simple apps, however, AI seems complicated" (UGB-4).	General lack of exposure meant that the rural public teachers had very low confidence: " <i>First we need electricity; then we can talk about skills</i> " (RGB-2). Rural private teachers improvised: " <i>AI outlines save us time of traveling to the city</i> " (RPB-3).
Theme 4: Psychological and Ethical Readiness Is Deeply Contextual	The teachers of urban schools became optimistic, but cautiously: "AI is revolutionary, but students can cease to think critically" (UPB-2). Issues were covered in cheating and discrimination.	Moral and cultural values were stressed by the teachers in rural schools: " <i>Teachers are fathers; machines cannot do the same job</i> " (RGB-3). The schools of girls emphasized decency and security: " <i>Family responsibilities should not be in conflict with screen time</i> " (RPG-1).
Theme 5: Professional Development Is the Missing Bridge	Urban private teachers received certifications: " <i>We use AI workshops on a regular basis</i> " (UPG-1). Urban public teachers complained of obsolete ICT training: " <i>Nothing AI-specific</i> " (UGB-3).	Rural public teachers did not mention AI training: " <i>Training should be brought to villages; we are unable to travel</i> " (RGB-1). Localized training was needed by the rural private teachers: " <i>Solar-powered workshops in the villages will be good</i> " (RPB-1).

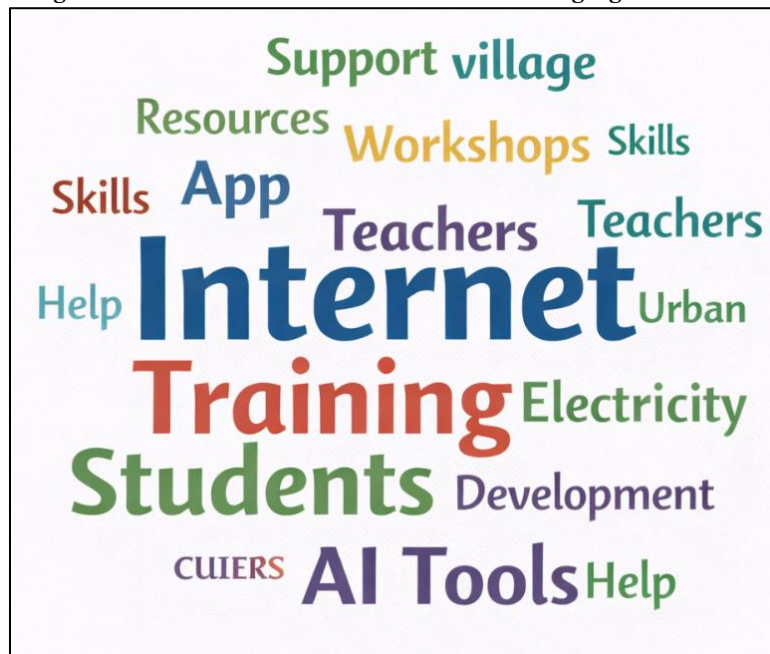
Figure 1. Word Cloud of Key Concepts in Teachers' Digital Readiness for AI Integration



This word cloud graphically illustrates common notions in the focus group discourses, including structural, cognitive, and contextual aspects of the

teacher preparedness to incorporate AI in both rural and urban schools.

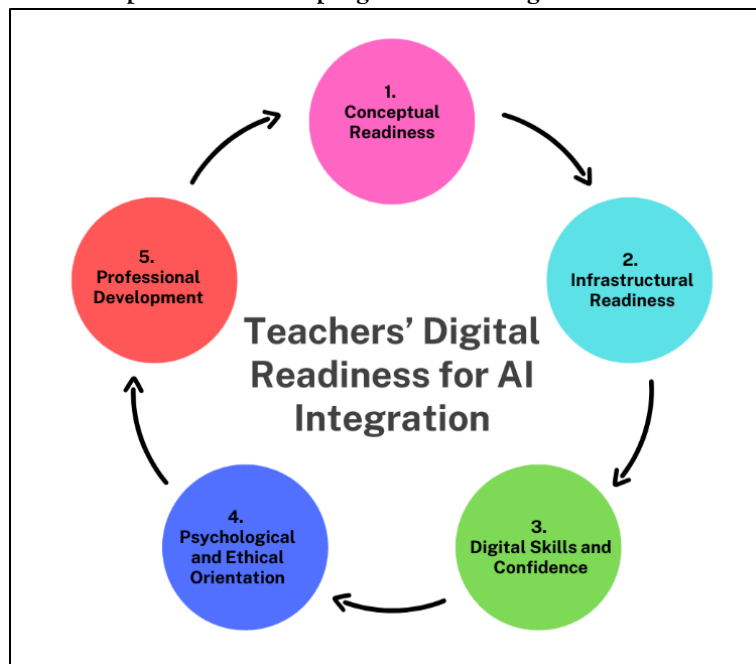
Figure 2. Word Cloud of Salient Terms Emerging from FGDs



This word cloud visualizes the salient terms that are mostly mentioned when discussing focus groups with teachers, thus demonstrating the important structural, pedagogical, and capacity-

related issues, including the internet access, training, electricity, and AI tools, which influence the concept of digital readiness in both rural and urban schools to integrate AI.

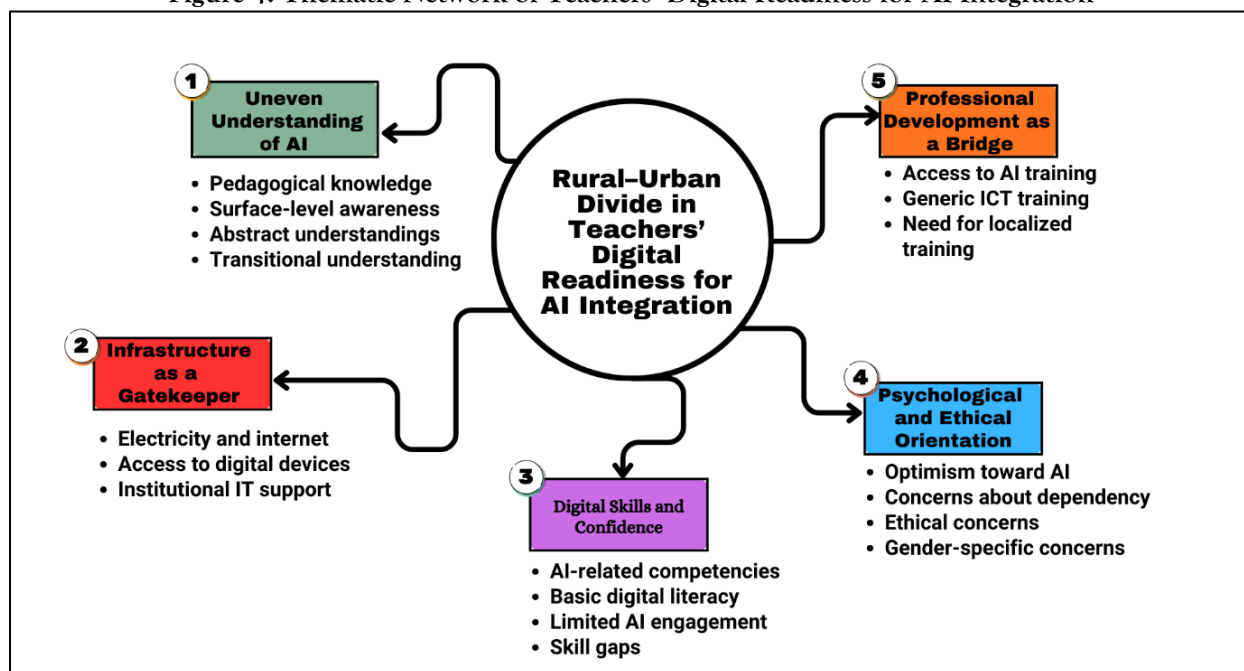
Figure 3. Thematic Map of Factors Shaping Teachers' Digital Readiness for AI Integration



This thematic map demonstrates the interconnected idea conceptual, structural, skill-based, psychological, and professional factors that

affect the digital preparedness of teachers in the context of the integration of AI in rural and urban school settings.

Figure 4. Thematic Network of Teachers' Digital Readiness for AI Integration



This thematic network emphasizes on how the willingness of teachers to adopt AI is predetermined by converging structural, cognitive, skill-oriented, and value-oriented forces. The global theme encompasses the rural-urban difference buttressed by five organizing themes based on qualitative information in various school contexts.

9. Results and Findings

The qualitative analysis of eight focus group discussions with teachers in rural and urban public and private schools revealed 5 interrelated themes describing the rural-urban divide of digital readiness for AI integration. These themes reveal differences between teachers in terms of conceptual understanding of AI, infrastructural and institutional conditions, digital skills and confidence, psychological and ethical orientations and professional development needs. While some of the concerns were common across contexts, the

ways in which they were articulated differed considerably depending on location, sector and gendered school environments.

9.1 Theme 1: Uneven Conceptualization of AI Shapes Readiness

Teachers' conceptual understanding of artificial intelligence widely differed and became a low-level element that has a role in artificial intelligence readiness. Urban private-school teachers showed a workable and pedagogical knowledge of AI and explained it as a tool for personalisation, assessment and teaching efficiency. One teacher explained "AI helps us to adapt learning to individual students; the system is adjusting the difficulty automatically based on performance" (UPB-1). Another mentioned its use in classroom planning stating, "AI generates customized lesson plans instantly, which saves us hours" (UPB-3).

Urban public-school teachers displayed partial knowledge that was often based on media

information or informal experimentation. While there were some people who saw the instructional potential of AI, their descriptions were at a surface level. For instance, one of the teachers shared, *"AI is like virtual tutors or chatbots that help students but we haven't used it properly in school"* (UGB-1). Another described AI as *"apps that predict student marks or help with language learning"* (UGB-2), demonstrating awareness without sustained engagement.

In contrast, rural public-school teachers expressed abstract and symbolic constructions of AI, often accompanied by metaphors based on imagination, religion or hearsay. One participant commented, *"AI is like magic computers taking care of problems on their own, we only hear about it on the television"* (RGB-1). A rural girls' school teacher referred to AI as *"something like jinn in computers helping sums"* (RGG-1), pointing to the conceptual distance that the lack of exposure brings.

Rural private-school teachers existed in an in-between space; conceptual clarity being created through mobile phones and limited internet connectivity. One teacher provided this feedback, *"I used a free AI app on my phone for math examples; it was helpful but basic"* (RPB-1). These results indicate that the acquisition of conceptual readiness determined by exposure rather than by formal qualifications and teaching experience.

9.2 Theme 2: Infrastructure Acts as the Primary Gatekeeper of AI Integration

Throughout all the focus groups, infrastructure was the most overriding factor in determining AI readiness. Teachers always pointed out that without stable electricity, internet connectivity, and devices, the integration of AI was still impossible no matter how much interest and motivation existed.

Resource-rich environments that allowed experimentation and innovation were described by urban private-school teachers. One participant stated that, *"We have fibre internet, smart classes, and a separate IT team, so running AI pilots is not a problem"* (UPB-4). Similarly, one teacher from an urban private girls' school remarked, *"With one-to-*

one devices and secure networks, AI tools are easy to integrate into daily lessons" (UPG-4).

Urban public-school teachers said they had partial access to infrastructure, but too many disruptions meant that they could not use it to any great extent. One of the teachers explained that *"We have computers and projectors, but the internet is unreliable, so AI tools often don't work when needed"* (UGG-1). Another added *"Even simple AI videos buffer endlessly due to slow Wi-Fi"* (UGB-2).

In rural public schools, infrastructure deficits were extreme and basic. Teachers constantly stressed that the lack of electricity and the internet were insurmountable barriers. As one teacher put it bluntly, *"There is no electricity most days so talking about AI does not make sense for us"* (RGG-1). Another commented, *"We don't even have a computer lab, AI is a dream of city schools not villages"* (RGB-3).

Rural private schools showed some but not a great deal of infrastructural investments, which are often based on solar power and mobile data. One teacher explained, *"We do have solar panels and a 4G router, so there is some basis for AI, but there are still power cuts and all that goes down with it"* (RPB-4). These findings highlight the gate keeping role of infrastructure that either makes or completely impedes integration of AI.

9.3 Theme 3: Digital Skills Are Shaped by Access Rather Than Motivation

Digital skills and confidence of teachers reflected the infrastructural conditions of the schools. The teachers of urban private schools had high and sometimes expert scores of confidences and usually described advanced competencies. According to one teacher, *"AI implies highly sophisticated prompting, data analytics, and liaising with learning management systems, and we will be fine with that"* (UPB-1). The other one added, *"We train students to use AI to debug and write projects"* (UPB-4).

There was moderate confidence among the urban public-school teachers, and the confidence was restricted to simple applications. One of the participants commented, *"I can work with slides and Google Classroom and simple applications, but AI seems*

more complicated" (UGB-4). There was one more common, "I believe with mere tools, yet more sophisticated AI needs more training and more equipment" (UGG-2).

Teachers in rural public schools were extremely low in confidence saying that it was due to lack of exposure and not to disposition. The first teacher stated, First of all, "we should have electricity and devices, then we will be able to discuss skills" (RGB-2). Some of them said, "we are not opposed to learning, we just have never used such technology" (RGG-3).

The development of adaptive skills among rural private-school teachers was noted whereby they used mobile phones frequently. One of the teachers added, "AI saves us the time spent in the city to find some resources" (RPB-3). Such results suggest that structural inequities are the cause of digital skill gaps as opposed to teacher resistance.

9.4 Theme 4: Psychological and Ethical Readiness Is Deeply Contextual

The attitude of teachers towards the incorporation of AI was highly psychological, ethical and cultural in nature. The views of urban teachers in private schools were mostly optimistic, and they saw AI as groundbreaking and showed professional caution.

One of the teachers observed, "AI is game changer in learning, but students will cease to think, unless we direct them to do so" (UPB-2). The other issue was the question of ethics that said, "I am concerned with Algorithmic bias in Pakistani circles" (UPB-2).

There were ambivalent attitudes among urban teachers in the public schools. Although they recognized the advantage of AI, they were concerned about classroom management and abuse. One of the educators commented, "AI is useful, but boys can copy answers without comprehension" (UGB-1).

The scepticism in rural public schools became based on the values and lived realities. Educators stressed the importance of human relationships, righteousness, and religion. According to one of the participants, "teachers act as fathers to students; machines cannot substitute the role of a teacher" (RGB-3). The second concern which is stated is the cultural disruption with the saying noting,

"Technology has to be in line with our religious and cultural values" (RGG-4).

The safety, modesty, and family expectations were closely related to ethical preparedness in girls' schools. One of the rural private girls' school teachers wrote, "AI will assist in making learners quiet, yet, screen time should not interfere with domestic tasks" (RPG-1). These results indicate that the opposition to AI has been more value-based and not anti-technological.

9.5 Theme 5: Professional Development Is the Missing Bridge

The teachers in all contexts have seen professional development as the key missing ingredient in the integration of AI. Teachers in urban private schools also stated that they could access certifications and continuing training. According to one teacher, "the school attends AI workshops regularly and tries new tools as a part of school-sponsored programs" (UPG-1).

City teachers in the public schools reported on occasional ICT training which never covered AI. According to one of the respondents, "the course we had was a computer course several years ago, however, not specifically on AI" (UGB-3).

There was no AI-related training according to rural teachers of the public school. One of the teachers stressed that "training should be delivered in the villages; we cannot get to cities" (RGB-1). This need was also reflected by rural private-school teachers who proposed mobile and community-based training. One of the comments said "it would be good to have solar-powered workshops in the neighbourhoods" (RPB-1).

These results highlight the importance of a professional development as one of the bridging mechanisms that can help to reduce the structural inequalities.

9.6 Overall Synthesis of Findings

Taken together, the findings reveal that digital readiness for AI integration among Pakistani teachers is shaped by intersecting structural, cognitive, and cultural factors. While urban private schools demonstrate high readiness across all dimensions, rural public schools face

foundational barriers that extend beyond individual capability. The rural-urban divide thus represents a multidimensional disparity encompassing infrastructure, skills, values, and professional support rather than a simple technological gap.

10. Discussion

The present research investigated the digital preparedness of teachers toward the integration of artificial intelligence (AI) in both rural and urban schools and showed that there is a multidimensional gap determined by structural, cognitive, and sociocultural aspects. The results indicate that AI preparedness is not a case of technological availability but it is an outcome of interaction between infrastructure, exposure, professional encouragement, and value orientations in relation to teaching.

One of the most important results is the variations in the conceptual knowledge of AI by teachers. Teachers at urban private schools expressed functional and pedagogically based conceptions of AI, which were more exposed and supported by the institution. Contrarily, abstract or symbolic descriptions were frequently found by rural teachers of public schools meaning that they were not exposed to these themes but may have been resistant to them. This confirms the previous studies which have indicated that the conceptual readiness is based on the meaningful interaction with technology and not just the motivation.

The infrastructure appeared to be the key entry point to AI integration. Educators always reported that as long as there are no trustworthy electricity and internet connections and equipment, AI implementation is impossible irrespective of the level of interest. The comparison of the urban private and rural public schools implies that AI efforts can support the existing disparities in case the inequalities are not mitigated with the help of the infrastructural gaps being addressed.

The institutional conditions and access determined the digital capabilities and confidence of the teachers. The teachers of the urban private schools had better competencies, and teachers of the rural public schools were lowly confident because of less exposure. Nevertheless, rural

teachers of the private school demonstrated adaptive utilization of mobile technologies which opposed deficit-based perspectives of the rural teachers as slow to change.

Ethical and psychological preparedness on AI was well situational. Teachers in an urban school were both positive and cynical together with the fears of critical thinking, academic integrity, and biasness. The reservations associated with rural teachers were illustrations of morality and cultural appropriation and the well-related perceptions of teaching, especially within the school of girls where the perceptions were shaped by the safety and family issues. These results demonstrate the necessity of culturally responsive AI integration.

The development of the profession became one of the missing links in the contexts. Training was provided continuously in urban private schools and little or none in rural and public-school teachers. The necessity to invest in the teacher capacity over the long term is driven by the demand of professional development that is local and accessible to the community to facilitate equitable and sustainable integration of AI.

11. Conclusion

This research offers a detailed qualitative insight into the rural-urban gap with regard to teacher digital preparedness to AI adoption in a school setting. These results show that individual competence or willingness is not the only factor that defines readiness, but rather a combination of structural, institutional, and sociocultural factors. Urban private schools are highly prepared in terms of conceptual, infrastructural, and professional aspects of readiness, whereas rural public schools are experiencing some underlying barriers that prevent even the simplest interaction with AI technologies.

Through foregrounding the voice of the teachers, the study brings out the fact that resistance to AI is most of the times situated in the context of realities and value considerations, and not against innovation. The results indicate that the introduction of AI initiative will not overcome the current education disparities unless there is a target approach to the mitigation of infrastructural

inequity, conceptual exposure, and professional assistance.

12. Recommendations

In the light of the results, a number of recommendations are offered. The foundational infrastructure development in the rural schools, especially stable electricity and internet access, should be the top priority on the agenda of policymakers as one of the conditions of AI integration. The AI-related educational changes must also have differentiated approaches where the disparities between rural and urban schools are taken into consideration in the implementation strategies instead of using the same models.

Institutions of teacher education and career development providers need to develop context-sensitive AI training opportunities that teachers can have access to in rural and public-sector schools. Practical solutions could be proposed by mobile training models, school-based training models, and community-based training models (localized training workshops, blended and solar-powered training initiatives). The emphasis can be placed on the conceptual knowledge, ethical applications and pedagogical implementations of AI instead of concentrating on the technical skills only in training.

School administrators are expected to promote conducive institutional cultures through promotion of experimentation, technical support as well as their moral and cultural issues. Gendered schooling environment deserves a special focus so that the introduction of AI does not contradict the safety, cultural standards, and family values.

13. Limitations of the Study

Although this research can be very insightful, a number of limitations need to be mentioned. First, qualitative design and purposive sampling restrict the possibility of generalizing the findings to the broader context of schools studied. Second, the focus group discussions were used as a mode of collecting data, and this method might have had an effect on the answers given by the participants because of group dynamics or social desirability.

Third, the research concentrated on the views of teachers, and it did not involve administrators, policy-makers, or students, whose opinions might give a more detailed picture of AI preparedness. Future studies can help to overcome these limitations through adopting mixed-method designs, increasing sample sizes, and studying longitudinal variation in the practices of AI integration.

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