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Readiness and Challenges among School Teachers for Integrating the Indian Knowledge System (IKS) through Artificial Intelligence: A Study of Jharkhand

An Empirical Study

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Abstract

The National Education Policy (NEP) 2020 envisions the integration of the Indian Knowledge System (IKS) across school and higher education curricula, and simultaneously promotes the use of Artificial Intelligence (AI) as a pedagogical and administrative tool. The confluence of these two mandates places school teachers at the centre of a complex professional transition that requires them to be conceptually rooted in indigenous knowledge traditions while being technologically competent enough to employ AI-based tools for content delivery, translation, contextualisation and assessment. This study examined the readiness and challenges of school teachers in Jharkhand for integrating IKS through AI-enabled pedagogy. A descriptive survey design was employed on a stratified random sample of 320 school teachers drawn from eight districts of Jharkhand (Ranchi, Dhanbad, East Singhbhum, West Singhbhum, Hazaribagh, Deoghar, Gumla and Palamu). Data were collected using a self-constructed and validated tool, the Teachers' Readiness and Challenges for IKS-AI Integration Scale (TRC-IKS-AI), comprising four readiness dimensions (cognitive, technological, pedagogical and attitudinal) and four challenge dimensions (infrastructural, training-related, curricular/content-related and attitudinal-resistance). Results indicated that the overall readiness of teachers was moderate ($M = 3.26$, $SD = 0.30$ on a 5-point scale), with attitudinal readiness being the strongest dimension ($M = 3.66$) and technological readiness the weakest ($M = 2.90$). Teachers reported a high overall level of challenge ($M = 3.58$), with training-related gaps ($M = 4.05$) and infrastructural deficits ($M = 4.00$) emerging as the most severe barriers. Independent samples t-tests revealed statistically significant differences in readiness by locale, with urban teachers ($M = 3.33$) scoring higher than rural teachers ($M = 3.21$, $p < .001$), and in challenges by locale, with rural teachers reporting significantly higher challenges ($M = 3.64$) than urban teachers ($M = 3.49$, $p < .001$). One-way ANOVA showed a significant effect of academic qualification on readiness ($F = 4.10$, $p = .017$), with doctorate/M.Phil. holders reporting the highest readiness ($M = 3.42$). Gender, school management type and teaching experience did not yield statistically significant differences. The study concludes that while Jharkhand's school teachers hold favourable attitudes toward IKS-AI integration, structural and capacity-building gaps — particularly digital infrastructure and in-service training — constrain actual readiness, especially in rural and tribal-dominated districts. Policy-level interventions in teacher training, infrastructure development, and locally contextualised AI-IKS content are recommended.

Keywords: ***Indian Knowledge System, Artificial Intelligence, Teacher Readiness, NEP 2020, Jharkhand, School Education, Digital Pedagogy***

1. Introduction

India's civilisational continuity has been sustained through diverse and layered systems of knowledge — encompassing Ayurveda, Yoga, Vastu, traditional agriculture, tribal ecological wisdom, indigenous mathematics, classical arts, and oral literary traditions. Collectively referred to as the Indian Knowledge System (IKS), these bodies of knowledge represent centuries of empirical observation, philosophical inquiry and community-based practice. The National Education Policy (NEP) 2020 explicitly calls for the "integration of India's rich, diverse, ancient and modern culture and knowledge systems and traditions" into the school and higher education curriculum, positioning IKS not as a nostalgic add-on but as a legitimate epistemological resource for twenty-first century learners.

Parallel to this policy thrust, the same document identifies Artificial Intelligence (AI) as a critical technology for transforming teaching-learning processes, enabling personalised learning paths, intelligent tutoring, automated assessment, and multilingual content translation. The Ministry of Education's AI-related missions, together with State-level digital education initiatives, have accelerated the diffusion of AI-based tools such as adaptive learning platforms, chatbots, speech-to-text translators and generative content-creation tools into government and private schools alike.

The simultaneous push for IKS integration and AI adoption creates a unique and largely unexamined pedagogical

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intersection: teachers are now expected to use AI-enabled tools to contextualise, translate, digitise and disseminate indigenous knowledge content in ways that are pedagogically sound and culturally authentic. This is a demanding proposition, particularly in states such as Jharkhand, where a predominantly rural and tribal population, uneven digital infrastructure, and linguistic diversity (Santhali, Mundari, Ho, Kurukh, Nagpuri, among others) intersect with chronic shortages of in-service AI training for teachers. Jharkhand is also one of the richest reservoirs of tribal and folk knowledge systems in India — including indigenous forestry practices, traditional medicine, tribal art (Sohrai and Khovar painting), and community-based ecological management — making it an especially relevant, and under-researched, site for examining how teachers navigate the IKS-AI integration mandate.

Against this backdrop, the present study investigates the readiness of Jharkhand's school teachers to integrate IKS through AI-enabled pedagogy, and the specific infrastructural, professional and attitudinal challenges they encounter in doing so.

2. Review of Related Literature

A growing body of literature has examined teacher readiness for technology integration and, more recently, for AI adoption in classrooms, though studies specifically connecting this readiness to Indian Knowledge System integration remain sparse.

Studies on educational technology adoption have long used readiness frameworks — such as the Concerns-Based Adoption Model and the Technology Acceptance Model — to explain why teachers vary widely in their uptake of new tools, typically citing perceived usefulness, self-efficacy, and institutional support as key predictors. Research following the introduction of NEP 2020 has documented substantial ambiguity among school teachers regarding what IKS integration concretely entails in subject-wise lesson planning, with many teachers reporting that they possess informal or experiential knowledge of local traditions but lack pedagogical training to translate this knowledge into structured curricular content.

On the AI front, national and international surveys of school teachers consistently report a gap between generic digital literacy (use of smartphones, WhatsApp, basic presentation software) and specific AI-tool literacy (prompt engineering, AI-based content generation, adaptive assessment platforms). Rural-urban and government-private disparities in digital infrastructure — internet connectivity, availability of computer laboratories, smart classrooms — have been repeatedly identified as a primary structural barrier to technology-enabled teaching in eastern Indian states, including Jharkhand, where the terrain and dispersed tribal habitations compound connectivity challenges.

A smaller strand of literature focused specifically on tribal and indigenous knowledge documentation suggests that digital and AI tools, if appropriately designed, can support the preservation and transmission of endangered oral traditions and minority languages by enabling transcription, translation and multimedia archiving; however, these studies caution that without teacher capacity-building, such tools risk decontextualising or diluting indigenous knowledge rather than authentically representing it.

Taken together, the literature suggests three consistent gaps: (a) limited empirical data on teacher readiness at the intersection of IKS and AI specifically, as opposed to either construct in isolation; (b) insufficient state-specific research capturing the unique tribal-linguistic-infrastructural context of states like Jharkhand; and (c) a paucity of studies employing validated multidimensional readiness-and-challenge instruments rather than single-item or purely qualitative measures. The present study addresses these gaps.

3. Rationale of the Study

Jharkhand presents a distinctive case for studying IKS-AI integration readiness. It is home to 32 recognised tribal communities constituting roughly a quarter of the state's population, and its school system spans over 35,000 government, aided and private institutions with widely varying levels of digital infrastructure. While the state has rolled out digital classroom initiatives and teacher-training programmes under central and state schemes, no known study has empirically mapped how prepared Jharkhand's teachers feel to use AI tools specifically for IKS integration, nor systematically catalogued the barriers they face. Given the policy urgency created by NEP 2020 and the state's unique socio-cultural knowledge assets, an evidence-based understanding of teacher readiness and challenges is essential to inform targeted training design, infrastructure investment, and curriculum development.

4. Objectives of the Study

- To assess the overall level of readiness of school teachers in Jharkhand for integrating the Indian Knowledge System (IKS) through Artificial Intelligence (AI).
- To study the dimension-wise readiness of teachers (cognitive, technological, pedagogical and attitudinal) for IKS-AI integration.
- To identify and analyse the major challenges (infrastructural, training-related, curricular/content-related and attitudinal-resistance) faced by teachers in this integration.
- To compare teacher readiness and challenges across selected demographic variables — gender, locale (rural/urban), school management type (government/private), teaching experience and academic qualification.
- To examine the relationship between teachers' readiness and the challenges they perceive.
- To suggest measures for enhancing teacher readiness and mitigating challenges for effective IKS-AI integration in Jharkhand's schools.

5. Hypotheses

- H01: There is no significant difference in the readiness of male and female teachers for IKS-AI integration.
- H02: There is no significant difference in the readiness of rural and urban teachers for IKS-AI integration.
- H03: There is no significant difference in the readiness of government and private school teachers for IKS-AI integration.
- H04: There is no significant difference in the readiness of teachers across levels of teaching experience.
- H05: There is no significant difference in the readiness of teachers across levels of academic qualification.

- H06: There is no significant difference in the challenges perceived by rural and urban teachers for IKS-AI integration.
- H07: There is no significant relationship between teachers' readiness and the challenges they perceive.

6. Methodology

6.1 Research Design

The study adopted a descriptive survey design employing a quantitative approach to measure the readiness and challenges of school teachers in Jharkhand for integrating IKS through AI.

6.2 Population and Sample

The population comprised in-service school teachers (upper primary, secondary and senior secondary) employed in government, government-aided and private schools across Jharkhand. Using a stratified random sampling technique with district and school-management type as strata, a sample of 320 teachers was drawn from eight districts — Ranchi, Dhanbad, East Singhbhum, West Singhbhum, Hazaribagh, Deoghar, Gumla and Palamu — selected to represent the state's administrative divisions, urban-industrial belts (Dhanbad, East Singhbhum), and predominantly rural/tribal regions (Gumla, West Singhbhum, Palamu).

6.3 Tool Used

Data were collected using a self-constructed and validated instrument, the Teachers' Readiness and Challenges for IKS-AI Integration Scale (TRC-IKS-AI). The scale contains 64 items rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), organised into two parts: (a) a Readiness section comprising four sub-dimensions — Cognitive Readiness (awareness and conceptual understanding of IKS and AI), Technological Readiness (digital and AI-tool proficiency), Pedagogical Readiness (ability to design AI-assisted IKS-integrated lessons), and Attitudinal Readiness (motivation and openness toward the integration); and (b) a Challenges section comprising four sub-dimensions — Infrastructural Challenges, Training-related Challenges, Curricular/Content Challenges, and Attitudinal Resistance/Motivational Barriers. Content validity was established through expert review by a panel of five subject experts in education and educational technology, and reliability was estimated using Cronbach's alpha ($\alpha = 0.86$ for the Readiness section and $\alpha = 0.81$ for the Challenges section), indicating good internal consistency. A structured demographic datasheet captured gender, locale, school management type, teaching experience and academic qualification.

6.4 Data Collection and Analysis

Data were collected through a combination of physical and Google Forms-based administration between February and April 2026, following institutional permissions and informed consent. Completed responses were screened for missing values and response-pattern anomalies; 320 valid responses were retained for analysis. Data were analysed using descriptive statistics (mean, standard deviation, frequency, percentage), independent samples t-test, one-way ANOVA, and Pearson product-moment correlation, computed at the 0.05 level of significance.

6.5 Sample Profile

Table 1: Demographic Profile of the Sample (N = 320)

Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	165	51.6
	Female	155	48.4
Locale	Rural	182	56.9
	Urban	138	43.1
School Type	Government	217	67.8
	Private	103	32.2
Teaching Experience	Below 5 years	98	30.6
	5–15 years	128	40.0
	Above 15 years	94	29.4
Qualification	Graduate (B.Ed)	171	53.4
	Post-Graduate (M.Ed/PG)	125	39.1
	Doctorate/M.Phil.	24	7.5

Table 1 shows a fairly balanced sample in terms of gender, with a slightly higher proportion of teachers drawn from rural areas (56.9%) and government schools (67.8%), reflecting the actual distribution of school types in Jharkhand. The majority of respondents (69.4%) had over five years of teaching experience, and a small but meaningful proportion (7.5%) held a doctorate or M.Phil. qualification.

7. Data Analysis and Interpretation

This section presents the analysis of data pertaining to the readiness and challenges of school teachers in Jharkhand for IKS-AI integration, organised objective-wise.

7.1 Overall Readiness Level of Teachers

Total readiness scores of respondents were computed and classified into three levels — Low (below 2.5), Moderate (2.5–3.5) and High (above 3.5) — on the five-point scale.

Table 2: Distribution of Teachers by Overall Readiness Level (N = 320)

Readiness Level	Frequency (f)	Percentage (%)
Low (< 2.5)	1	0.3
Moderate (2.5–3.5)	252	78.8
High (> 3.5)	67	20.9

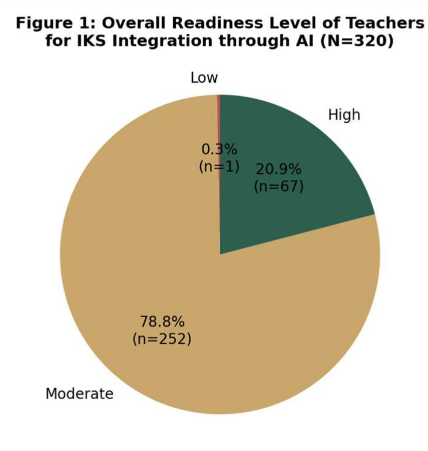

Figure 1: Overall Readiness Level of Teachers for IKS Integration through AI (N = 320)

Table 2 and Figure 1 show that a large majority of teachers (78.8%) fall in the moderate readiness category, with about one-fifth (20.9%) demonstrating high readiness and a negligible proportion (0.3%) in the low readiness category. This indicates that although Jharkhand's teachers are not unprepared, very few have attained a consistently high level of readiness across all dimensions of IKS-AI integration, suggesting considerable scope for targeted capacity-building.

7.2 Dimension-wise Readiness of Teachers

Table 3: Descriptive Statistics of Dimension-wise Readiness Scores (N = 320)

Dimension	Mean (M)	SD	Interpretation
Cognitive Readiness	3.42	0.57	Moderate-High
Technological Readiness	2.90	0.68	Moderate (weakest)
Pedagogical Readiness	3.06	0.56	Moderate
Attitudinal Readiness	3.66	0.49	High (strongest)
Overall Readiness	3.26	0.30	Moderate

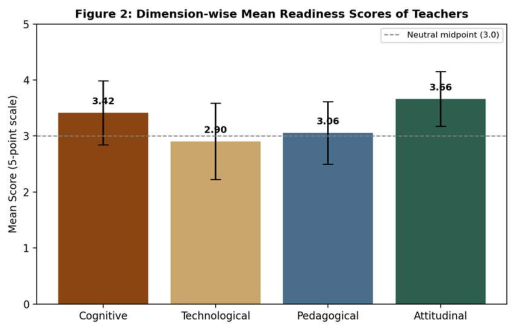

Figure 2: Dimension-wise Mean Readiness Scores of Teachers

As presented in Table 3 and Figure 2, Attitudinal Readiness recorded the highest mean score (M = 3.66, SD = 0.49), indicating that teachers are largely motivated and open toward integrating IKS through AI, viewing it as educationally valuable. Cognitive Readiness was the next strongest dimension (M = 3.42), reflecting reasonably good conceptual awareness of both IKS content and AI applications. In contrast, Technological Readiness emerged as the weakest dimension (M = 2.90, SD = 0.68), the only dimension falling close to the scale midpoint, pointing to a considerable gap in teachers' practical AI-tool proficiency — such as using generative AI for content creation, adaptive learning platforms, or AI-based translation tools. Pedagogical Readiness (M = 3.06) was also only moderate, suggesting that even teachers with adequate conceptual and attitudinal readiness often lack concrete instructional strategies for embedding IKS content into AI-assisted lesson design. This pattern — strong attitude and awareness but weak technological and pedagogical execution — is a recurring finding in technology-adoption literature and signals that motivation alone is insufficient without skill-based training.

7.3 Dimension-wise Challenges Faced by Teachers

Table 4: Descriptive Statistics of Dimension-wise Challenge Scores (N = 320)

Dimension	Mean (M)	SD	Interpretation
Infrastructural Challenges	4.00	0.54	High
Training-related Challenges	4.05	0.47	High (most severe)
Curricular/Content Challenges	3.62	0.54	High
Attitudinal Resistance	2.64	0.60	Moderate (least severe)
Overall Challenge	3.58	0.28	High

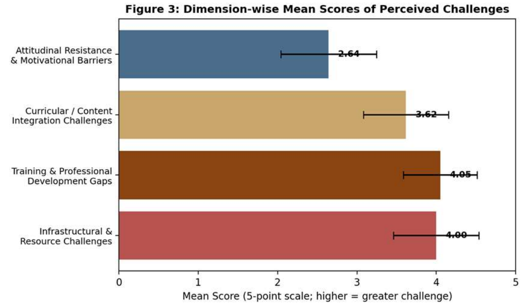

Figure 3: Dimension-wise Mean Scores of Perceived Challenges

Table 4 and Figure 3 reveal that Training-related Challenges were rated the most severe (M = 4.05, SD = 0.47), closely followed by Infrastructural Challenges (M = 4.00, SD = 0.54). This indicates that the absence of structured, hands-on in-service training in AI tools, and inadequate digital infrastructure (computers, stable internet connectivity, smart classrooms, especially in rural and tribal blocks), constitute the two most pressing barriers reported by teachers. Curricular/Content Challenges (M = 3.62) were also rated fairly high, reflecting difficulties in locating or creating AI-compatible digital content that authentically represents local tribal and indigenous knowledge traditions. Notably, Attitudinal Resistance recorded the lowest mean (M = 2.64), corroborating the high Attitudinal Readiness finding in Table 3 — teachers are, on the whole, not resistant to the idea of IKS-AI integration; the barriers they face are predominantly structural and capacity-related rather than motivational.

Table 5: Distribution of Teachers by Overall Challenge Level (N = 320)

Challenge Level	Frequency (f)	Percentage (%)
Moderate (2.5–3.5)	124	38.8
High (> 3.5)	196	61.3

As shown in Table 5, nearly two-thirds of the sampled teachers (61.3%) perceive a high level of overall challenge in integrating IKS through AI, underscoring the urgency of infrastructural and training interventions.

7.4 Readiness across Demographic Variables

To test hypotheses H01 to H05, independent samples t-tests were computed for dichotomous variables (gender, locale, school type) and one-way ANOVA for variables with more than two categories (teaching experience, qualification).

Table 6: Independent Samples t-test for Overall Readiness by Gender, Locale and School Type

Variable	Group	N	Mean	SD	t-value	p-value	Result
Gender	Male	165	3.23	0.29	–1.72	.087	Not Significant
	Female	155	3.29	0.30			
Locale	Rural	182	3.21	0.29	–3.65	.000	Significant**
	Urban	138	3.33	0.29			

Variable	Group	N	Mean	SD	t-value	p-value	Result
School Type	Government	217	3.24	0.31	–1.90	.058	Not Significant
	Private	103	3.31	0.27			

**Significant at the 0.01 level (two-tailed)

The results in Table 6 indicate that Hypothesis H01 (gender) is retained (t = –1.72, p = .087 > .05); male and female teachers do not differ significantly in overall readiness, although female teachers showed a marginally higher mean. Hypothesis H02 (locale) is rejected: urban teachers (M = 3.33, SD = 0.29) scored significantly higher than rural teachers (M = 3.21, SD = 0.29), t = –3.65, p < .001, indicating that locale exerts a statistically significant influence on readiness — an outcome consistent with the generally better digital infrastructure and internet connectivity available in urban schools. Hypothesis H03 (school type) is retained at the conventional 0.05 threshold, though the difference between government (M = 3.24) and private (M = 3.31) school teachers approached significance (p = .058), suggesting a possible trend favouring private-school teachers that may reach significance in a larger sample.

Table 7: One-Way ANOVA for Overall Readiness by Teaching Experience and Qualification

Variable	Source	F-value	p-value	Result
Teaching Experience	Between Groups	2.50	.083	Not Significant
Academic Qualification	Between Groups	4.10	.017	Significant*

*Significant at the 0.05 level

Hypothesis H04 (teaching experience) is retained (F = 2.50, p = .083); teachers with below 5 years of experience recorded a marginally higher mean readiness (M = 3.32) than those with 5–15 years (M = 3.24) or above 15 years (M = 3.23) of experience, but the difference did not reach statistical significance, suggesting that newer entrants to the profession may possess a slight digital-native advantage without this translating into a decisive readiness gap. Hypothesis H05 (qualification) is rejected (F = 4.10, p = .017): teachers with a doctorate or M.Phil. qualification reported markedly higher readiness (M = 3.42, SD = 0.29) compared to postgraduate (M = 3.26, SD = 0.30) and graduate/B.Ed-only (M = 3.24, SD = 0.29) teachers, indicating that higher academic qualification is associated with greater readiness for IKS-AI integration, plausibly owing to greater research exposure and familiarity with academic technology.

7.5 District-wise Readiness

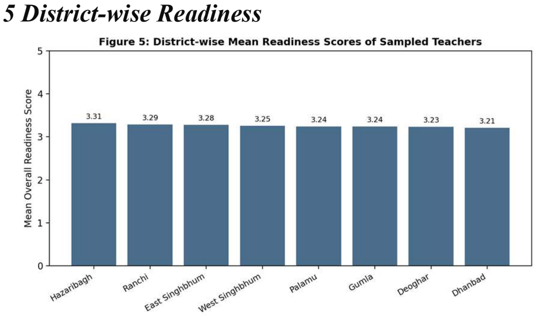

Figure 4: District-wise Mean Readiness Scores of Sampled Teachers

Figure 4 shows relatively narrow variation in mean readiness across the eight sampled districts, ranging from 3.21 (Dhanbad) to 3.31 (Hazaribagh). Despite this narrow range, a discernible pattern emerges: districts with larger urban-industrial populations and better connectivity (Hazaribagh, Ranchi, East Singhbhum) tend to show marginally higher readiness than predominantly rural, tribal-dominated districts (Dhanbad in this sample reflecting peri-urban-rural mix, Deoghar, Gumla), reinforcing the locale-based finding reported in Table 6.

7.6 Challenges by Locale

To test Hypothesis H06, an independent samples t-test compared overall challenge scores of rural and urban teachers.

Table 8: Independent Samples t-test for Overall Challenge by Locale

Variable	Group	N	Mean	SD	t-value	p-value	Result
Locale	Rural	182	3.64	0.26	4.99	.000	Significant **
	Urban	138	3.49	0.28			

**Significant at the 0.01 level (two-tailed)

Table 8 shows that Hypothesis H06 is rejected: rural teachers (M = 3.64, SD = 0.26) reported significantly higher overall challenge than urban teachers (M = 3.49, SD = 0.28), t = 4.99, p < .001. This finding is consistent with and complementary to the locale-based readiness result, and together they indicate a coherent rural-urban divide in both preparedness and perceived difficulty, driven largely by infrastructural disparity.

7.7 Relationship between Readiness and Challenges

To test Hypothesis H07, Pearson product-moment correlation was computed between teachers' overall readiness scores and overall challenge scores.

Table 9: Correlation between Overall Readiness and Overall Challenge Scores (N = 320)

Variables	r-value	p-value	Result
Overall Readiness × Overall Challenge	0.01	.843	Not Significant

Table 9 shows a negligible and statistically non-significant correlation between readiness and challenge scores (r = 0.01, p = .843); Hypothesis H07 is retained. This near-zero correlation is an important substantive finding: it suggests that teachers' sense of readiness and their perception of external/structural challenges operate as relatively independent constructs in this sample — a teacher may feel personally motivated and conceptually prepared (high readiness) while still facing substantial infrastructural or training-related barriers (high challenge) that are largely outside individual control. This reinforces the interpretation that challenges in Jharkhand are predominantly systemic (infrastructure, training provision) rather than a simple mirror-image of individual teacher readiness.

8. Major Findings

- The overall readiness of Jharkhand's school teachers for IKS-AI integration is moderate (M = 3.26, SD = 0.30), with 78.8% of teachers falling in the moderate readiness category and only 20.9% demonstrating high readiness.

- Among the four readiness dimensions, Attitudinal Readiness is the strongest (M = 3.66) and Technological Readiness the weakest (M = 2.90), indicating that teachers are motivated but technologically under-equipped.
- Teachers perceive an overall high level of challenge (M = 3.58), with Training-related Challenges (M = 4.05) and Infrastructural Challenges (M = 4.00) rated as the most severe, while Attitudinal Resistance (M = 2.64) is the least severe challenge.
- No statistically significant difference was found in readiness between male and female teachers ($t = –1.72$, $p = .087$).
- Urban teachers reported significantly higher readiness (M = 3.33) than rural teachers (M = 3.21), $t = –3.65$, $p < .001$.
- The difference in readiness between government (M = 3.24) and private (M = 3.31) school teachers approached but did not reach statistical significance ($p = .058$).
- Teaching experience did not significantly affect readiness ($F = 2.50$, $p = .083$), though newer teachers (below 5 years) showed marginally higher readiness.
- Academic qualification significantly affected readiness ($F = 4.10$, $p = .017$); doctorate/M.Phil. holders reported the highest readiness (M = 3.42).
- Rural teachers reported significantly higher overall challenges (M = 3.64) than urban teachers (M = 3.49), $t = 4.99$, $p < .001$.
- Overall readiness and overall challenge scores were not significantly correlated ($r = 0.01$, $p = .843$), suggesting these are largely independent constructs driven by different factors — individual motivation/competence versus systemic/structural conditions.

9. Discussion

The findings of this study present a nuanced picture of teacher preparedness in Jharkhand that diverges from a simple "ready" or "not ready" binary. Teachers exhibit strong favourable attitudes and reasonably good conceptual awareness of both IKS and AI, echoing the general enthusiasm for NEP 2020’s knowledge-integration vision observed in earlier post-policy studies. However, this attitudinal enthusiasm is not matched by technological or pedagogical competence, mirroring the well-documented "digital divide within readiness" phenomenon in Indian school education, where motivation frequently outpaces skill acquisition due to inadequate structured training opportunities.

The significant rural-urban gap in both readiness and challenges is consistent with Jharkhand’s known infrastructural profile, where dispersed tribal habitations and hilly terrain make consistent internet connectivity and electricity supply far less reliable than in urban and peri-urban belts. This gap has direct implications for equity: if AI-enabled IKS integration becomes a de facto marker of pedagogical innovation, rural and tribal teachers — and by extension their students, who are often the very custodians and beneficiaries of the indigenous knowledge being taught — risk being systematically disadvantaged unless infrastructure parity is prioritised.

The significant effect of academic qualification, but not of teaching experience, on readiness is a noteworthy finding. It suggests that formal exposure to research methodology and higher-order academic training (as gained in M.Phil./doctoral programmes) may better prepare teachers for the conceptual demands of integrating AI tools with indigenous knowledge content than years of classroom experience alone. This has direct implications for how in-service training programmes are designed — experience-based seniority should not be assumed to correlate with AI-readiness, and training should be differentiated accordingly rather than assuming senior teachers require less support.

The negligible correlation between readiness and challenges is perhaps the study’s most conceptually important finding. It empirically demonstrates that readiness (an individual-level construct of competence and motivation) and challenge (a largely externally-imposed, structural construct) are not simply inverse reflections of one another. A teacher can be highly motivated and knowledgeable, yet still face severe infrastructural barriers beyond their control. This decoupling argues against interventions that focus solely on individual attitude-change or motivational workshops; the data instead point toward infrastructure investment and structured, hands-on AI training as the higher-leverage policy interventions.

10. Educational Implications

- Teacher education and in-service training programmes should incorporate hands-on modules on specific AI tools (generative AI for content creation, AI-based translation and transcription for tribal languages, adaptive assessment platforms) rather than generic digital-literacy sessions.
- District and block-level infrastructure audits should be conducted, with priority investment in internet connectivity and computing devices for rural and tribal-block schools in districts such as Gumla, West Singhbhum, Deoghar and Palamu.
- State curriculum bodies (e.g., Jharkhand Council of Educational Research and Training) could develop a curated, AI-compatible digital repository of authenticated local IKS content — tribal art, oral literature, traditional ecological knowledge — co-created with community knowledge-holders, reducing the content-development burden on individual teachers.
- Given the significant effect of qualification, differentiated training tracks should be designed — mentorship or peer-learning models pairing highly qualified/high-readiness teachers with colleagues who need more support, particularly across experience levels.
- Since attitudinal resistance is low, training investments need not focus heavily on motivational or change-management content; resources are better allocated to skill-building and infrastructure.
- Government-private partnership models could help narrow the marginal government-private readiness gap by extending private-sector digital resources and training expertise to government schools.

11. Limitations of the Study

The study is confined to eight districts of Jharkhand and, although reasonably representative, does not cover all 24 districts of the state. The data are based on teachers’ self-reported perceptions rather than observed classroom practice or objective skill assessment, which may be subject to social-desirability bias. The cross-sectional design captures readiness and challenges at a single point in time and does not track change following any specific training intervention. Future longitudinal or mixedmethods studies incorporating classroom observation and qualitative interviews with tribal community knowledge-holders would provide a more complete picture.

12. Suggestions for Further Research

- A state-wide study covering all districts of Jharkhand, with proportionate representation of tribal-majority blocks, to validate and extend the present findings.
- Qualitative and ethnographic studies exploring how tribal community knowledge-holders perceive AI-mediated representation of their knowledge traditions.
- Experimental or quasi-experimental studies evaluating the effectiveness of specific AI-tool training interventions on teachers' pedagogical readiness.
- Comparative studies across other culturally and linguistically diverse Indian states to examine whether the readiness-challenge decoupling observed here is a general phenomenon.

13. Conclusion

This study set out to examine the readiness and challenges of school teachers in Jharkhand for integrating the Indian Knowledge System through Artificial Intelligence, a task situated at the intersection of two major thrusts of NEP 2020. The findings reveal a teacher workforce that is attitudinally willing and conceptually aware, but constrained by moderate technological and pedagogical readiness and by high, largely structural challenges — chiefly inadequate training and infrastructure. Significant rural-urban disparities in both readiness and challenges highlight an equity concern that policy-makers must address if the benefits of AI-enabled IKS integration are to reach Jharkhand's tribal and rural student populations, who are simultaneously the primary inheritors of the very knowledge systems the policy seeks to integrate. The near-zero correlation between readiness and challenges underscores that boosting individual motivation alone will not suffice; sustained investment in digital infrastructure and structured, tool-specific AI training is necessary to translate favourable teacher attitudes into effective classroom practice. With appropriately targeted interventions, Jharkhand is well positioned to become a model for how AI can be harnessed not to displace, but to preserve, contextualise and transmit, indigenous knowledge systems to future generations.

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