BRIDGING THE AI DIVIDE: CAPACITY BUILDING FOR RURAL UNDERGRADUATE EDUCATORS

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ABSTRACT:

The integration of Artificial Intelligence (AI) in education has become imperative, yet rural undergraduate educators face significant barriers in accessing and utilizing AI tools. This study examines AI awareness and adoption among undergraduate educators in rural Mandya District, Karnataka. A mixed-methods approach was used, involving a survey of 50 undergraduate educators and in-depth interviews with 5 educators. The findings reveal a significant gap in AI awareness and adoption, highlighting the need for targeted interventions. A contextual framework for AI capacity building is proposed to promote AI integration and bridge the AI divide. The findings underscore the need for targeted capacity-building initiatives to enhance AI literacy and confidence among rural educators, enabling them to integrate AI-powered tools into their teaching practices.

Keywords: AI integration, rural education, undergraduate educators, capacity building, AI literacy, AI divide, teacher training, educational technology, India.

INTRODUCTION:

The advent of Artificial Intelligence (AI) has transformed various sectors, including education, where it has the potential to enhance teaching, learning, and student outcomes. However, the benefits of AI in education are not equally accessible, particularly in rural areas. The "AI divide" refers to the disparity in AI knowledge, access, and adoption among educators, exacerbating existing educational inequalities. Rural undergraduate educators, in particular, face significant barriers in integrating AI tools into their teaching practices, hindering the quality of education imparted to students.

The integration of Artificial Intelligence (AI) in education has been gaining momentum worldwide, transforming the way we learn and teach. Globally, the AI education market is projected to reach $25.7 billion by 2030, growing at an annual rate of 36%. In rural areas, AI is helping bridge the urban-rural education gap by providing access to quality educational resources, virtual classrooms, and personalized learning experiences. Countries like India, China, and South Korea are investing heavily in AI education initiatives, with AI-driven platforms personalizing learning and improving student engagement. In India, initiatives like Mindspark have shown significant learning gains in math and language.

AI adoption among undergraduate educators in rural areas is gaining momentum worldwide.

- Global AI Education Market: The market size is projected to reach $25.7 billion by 2030, growing at an annual rate of 36%

- AI in Developing Countries: AI-driven platforms are being used to personalize learning, with countries like India, China, and South Korea investing heavily in AI education initiatives

- Rural Education: AI is helping bridge the urban-rural education gap by providing access to quality educational resources, virtual classrooms, and personalized learning experiences

- Teacher Training: Countries like Singapore, South Korea, and Finland are prioritizing AI teacher training programs to ensure educators are equipped to integrate AI effectively

- Student Engagement: AI-powered tools have shown to improve student engagement, with studies indicating a 23% better outcome in personalized learning

The advent of Artificial Intelligence (AI) is revolutionizing education, transforming the way educators teach and students learn. AI tools like Google Classroom, Kuria, QuillBot, Grammarly, Gradescope, Edmodo, and Century Tech, Turnitin, MagicSchool, Eduaide, SlidesAI, Quizizz, Canva, Curlpod, ChatGPT, Microsoft Copilot are increasingly being adopted in urban educational institutions, enhancing personalized learning, lesson planning, plagiarism detection, automating grading, creating engaging content and improving student outcomes. These AI tools not only help in streamlining the administrative work but also it improves teaching materials apart from providing personalised learning experiences. However, rural areas India, lag behind in AI adoption, with educators facing challenges in accessing these tools and integrating them into their teaching practices.

The integration of Artificial Intelligence (AI) in education has the potential to personalize learning, enhance student outcomes, and improve educational efficiency. However, rural undergraduate colleges face significant challenges in adopting AI technologies. This study assesses the current level of AI awareness and adoption among undergraduate educators in rural colleges of Mandya District, identifies the challenges and barriers, and proposes a contextual framework for AI capacity building.

The findings of this research will help to identify the existing gap between the urban and rural educators and will contribute to the development of targeted capacity-building initiatives, empowering rural educators to harness the potential of AI and promote equitable access to AI-enhanced education.

LITERATURE REVIEW:

The integration of Artificial Intelligence (AI) in education has been gaining momentum globally, with research highlighting its potential to enhance teaching, learning, and student outcomes (Zawacki-Richter et al., 2019; Roll & Wylie, 2016). However, the majority of existing studies focus on urban or developed contexts, leaving a significant gap in understanding AI adoption in rural areas, particularly in developing countries like India (Kumar et al., 2020).

Studies have identified several barriers to AI adoption in education, including lack of infrastructure, limited teacher training, and inadequate institutional support (Al-Emran et al., 2019; Chen et al., 2020). In the Indian context, research has highlighted the need for targeted interventions to address the digital divide and promote AI literacy among educators (Sarkar & Das, 2020; Singh & Singh, 2020).

This study aims to contribute to the existing literature by examining the current state of AI awareness and adoption among rural undergraduate educators in India, identifying the challenges, and proposing strategies to bridge the AI divide.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). AI in education: A review of the literature. Journal of Educational Computing Research, 61(4), 461-483.

RESEARCH GAP:

The existing literature highlights the potential of AI in education, but there is a dearth of research on AI awareness and adoption among undergraduate educators in rural areas, particularly in Mandya District, Karnataka. Most studies have focused on urban areas, leaving a significant knowledge gap on the challenges and barriers faced by rural educators. This study aims to bridge this gap by investigating AI awareness and adoption among undergraduate educators in rural Mandya District, providing insights for targeted interventions and policy initiatives.

Some specific gaps identified:

- Limited research on AI awareness and adoption in rural India
- Lack of contextual frameworks for AI capacity building in rural undergraduate education
- Insufficient understanding of the challenges and barriers to AI integration in rural areas

Need for the Study:

The integration of Artificial Intelligence (AI) in education has the potential to revolutionize the teaching-learning process, making it more personalized, efficient, and effective. However, rural undergraduate colleges in Mandya District, Karnataka, face significant challenges in adopting AI technologies due to limited infrastructure, lack of training, and inadequate support. This study aims to assess the current level of AI awareness and adoption among undergraduate educators in rural colleges of Mandya District, identify the challenges and barriers, and propose a contextual framework for AI capacity building. The findings of this study will inform policymakers, educators, and stakeholders about the needs and challenges of rural educators, enabling them to design targeted interventions to bridge the AI divide and promote equitable access to AI-enhanced education.

Research Questions:

1. What is the current level of AI awareness and adoption among undergraduate educators in rural colleges of Mandya District?
2. What are the major challenges and barriers to AI integration in undergraduate education in rural Mandya District?
3. How can AI capacity-building initiatives be designed to address the specific needs of undergraduate educators in rural colleges of Mandya District?

Objectives of the Study:

1. To assess the current level of AI awareness and adoption among undergraduate educators in rural colleges of Mandya District.
2. To identify the challenges and barriers faced by rural educators in Mandya District in integrating AI tools into their teaching practices.
3. To develop a Contextual Framework for AI Capacity Building: Propose a framework for AI capacity building, tailored to the needs of undergraduate educators in rural colleges of Mandya District.

Hypotheses:

H1: There is a significant gap in AI awareness and adoption among undergraduate educators in rural colleges of Mandya District.

H2: Infrastructure and training support have a significant impact on AI adoption among undergraduate educators in rural colleges of Mandya District.

H3: A contextual framework for AI capacity building will lead to improved AI literacy and adoption among undergraduate educators in rural colleges of Mandya District.

Research Methodology:

The study employed a mixed-methods approach, combining quantitative and qualitative methods to achieve the research objectives.

A stratified random sampling technique was used to select 50 undergraduate educators from rural colleges in Mandya District.

Data Collection Methods:

1. Survey Questionnaire: A structured questionnaire was used to collect data on AI awareness, adoption, and demographic characteristics.

2. In-depth Interviews: Semi-structured interviews were conducted with 5 educators to gather qualitative insights on challenges, barriers, and suggestions for AI capacity building.

Data Analysis: The data collected from the survey and interviews were analyzed using a combination of descriptive and inferential statistics, as well as thematic analysis.

Hypothesis 1: AI Awareness and Adoption Gap

Descriptive statistics revealed a significant gap in AI awareness and adoption among undergraduate educators in rural Mandya District. The mean AI awareness score was 2.5 (SD = 1.2) on a 5-point Likert scale, indicating a moderate level of awareness. However, only 30% of respondents reported using AI tools in their teaching practices.

Hypothesis 2: Infrastructure and Training Support

Chi-square test results showed a significant positive relationship between infrastructure (χ^2 = 12.5, $p < 0.01$) and training support (χ^2 = 10.2, $p < 0.01$) and AI adoption. Regression analysis revealed that infrastructure ($\beta = 0.45$, $p < 0.01$) and training support ($\beta = 0.38$, $p < 0.01$) were significant predictors of AI adoption.

Study showed that only 30% of institutions have adequate AI infrastructure (e.g., computer labs, internet connectivity). Only 25% of educators have received AI-related training in the past year. Government institutions have relatively better infrastructure (60% adequate) compared to private institutions (13% adequate). 75% of educators express need for AI training programs.

Hypothesis 3: Contextual Framework for AI Capacity Building

The thematic analysis of interview data reveals a comprehensive framework for AI capacity building among undergraduate educators in rural Mandya District.

Educators emphasize the need for discipline-specific, hands-on AI training that addresses their unique challenges.

They highlighted on the need for adequate computer labs, reliable internet, and accessible AI tools for effective AI integration.

They pointed on the need for regular guidance from experts and peer support networks can help educators overcome implementation barriers.

Major Findings

1. A significant gap exists in AI awareness and adoption among undergraduate educators in rural Mandya District, with a mean AI awareness score of 2.5 (SD = 1.2) on a 5-point Likert scale. The results indicate significant differences in AI awareness among undergraduate educators based on Gender, Age and Teaching experience. Male educators showed higher AI awareness than female educators. Younger educators (< 35 years) showed higher AI awareness compared to older age groups. Educators with 5-10 years' experience showed highest AI.

2. Only 30% of respondents reported using AI tools in their teaching practices, indicating low adoption rates. Male educators showed higher AI adoption than female educators. Younger educators (< 35 years) showed higher AI adoption compared to older age groups. Educators with 5-10 years' experience showed highest AI adoption. Study showed that there is a significant positive correlation between AI awareness and AI adoption

3. Infrastructure (χ^2 = 12.5, p < 0.01) and training support (χ^2 = 10.2, p < 0.01) are significantly related to AI adoption.

4. Regression analysis revealed infrastructure (β = 0.45, p < 0.01) and training support (β = 0.38, p < 0.01) as significant predictors of AI adoption.

5. A contextual framework with tailored training, infrastructure support, and ongoing mentoring is essential for improving AI literacy and adoption.

CONCLUSION

AI-driven educators are better equipped to provide personalized learning experiences, enhance student engagement, and improve academic outcomes. By leveraging AI, educators can use AI-powered tools for real-time feedback, adaptive assessments, and targeted interventions. They can analyse student data to identify learning gaps and tailor instruction. Automate administrative tasks and focus on high-impact teaching practices increases efficiency.

This study underscores the urgent need to empower rural educators in in rural India with the awareness, skills, and support necessary to harness AI's transformative potential. By addressing infrastructure gaps, providing contextual training, and fostering a collaborative ecosystem, we can bridge the rural-urban education divide and enable educators to leverage AI to enhance student learning outcomes, preparing the next generation for success in an increasingly AI-driven world.

Recommendations: Based on the study's findings, the following recommendations are proposed:

For Policymakers

1. Infrastructure Development: Invest in upgrading infrastructure, including high-speed internet, computer labs, and AI-enabled devices, to support AI adoption in rural colleges.

2. Training and Capacity Building: Develop and implement comprehensive training programs for educators, focusing on AI literacy, integration strategies, and pedagogical approaches.

3. Contextual Framework: Develop and disseminate a contextual framework for AI capacity building, tailored to the needs of rural undergraduate educators.

For Educators

1. Engage in Professional Development: Participate in training programs and workshops to enhance AI literacy and integration skills.

2. Collaborate and Share Best Practices: Share experiences, challenges, and best practices with peers to foster a community of practice.

3. Integrate AI into Teaching Practices: Gradually incorporate AI tools and technologies into teaching practices to enhance student learning outcomes.

For Institutions

1. Provide Ongoing Support: Offer ongoing technical and pedagogical support to educators to ensure successful AI integration.

2. Foster a Culture of Innovation: Encourage innovation, experimentation, and risk-taking among educators to promote AI adoption.

3. Monitor and Evaluate Progress: Regularly monitor and evaluate AI adoption and its impact on student learning outcomes.

By implementing these recommendations, stakeholders can work together to bridge the AI awareness and adoption gap, ultimately enhancing the quality of education in rural area.

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