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Technology in Teacher Training: Challenges and Policy Directions from DIETs in Manipur

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Abstract

ICT Integrating teacher education is crucial for the quality, literacy, and preparation of the teachers for imparting knowledge effectively. Even though ICT-based teacher training is envisaged in NEP 2020, there exists a large gap to be filled before ICT can truly be a part of teacher education in the rural and tribal areas of the country in terms of infrastructural availability and accessibility (such as - lack of proper digital infrastructure; lack of faculty training; and lack of digital connectivity). This research explores the ICT resources of five DIETs located in hill districts of Manipur, and challenges with ICT adoption. It is also observed that there are ICT resource centres but there are inactive in use since there are no smart classrooms, no Wi-Fi, and no organized digital training programs. Faculty lack the training in digital pedagogy needed to support technology-enabled teaching. There is also very low access to e-learning platforms for student-teachers, further exacerbating the digital divide that exists between rural and urban teacher education institutes. The study suggests improving ICT infrastructure, giving training in digital pedagogy to the faculty, implementing policy interventions, and enhancing government support to close the digital divide and improve the alignment of these rural DIETs to the ICT goals of NEP 2020.

Keywords: ICT in teacher education, digital divide, NEP 2020, teacher training, rural education

1. BACKGROUND AND CONTEXT

Advancement in Information and Communication Technology (ICT) has tremendously transformed education globally. The old traditional teaching methods of using textbooks and blackboard are now integrated with educational technology (UNESCO, 2019). ICT is essential in teacher education, aiding lesson planning, enhancing digital literacy, and equipping educators for contemporary classrooms (Mishra & Koehler, 2006).

The NEP 2020 realizes the need and the importance to integrate technology into teacher's training, ICT based learning environments, online platforms and the digital literacy programs (Ministry of Education, 2020). Several of these teacher capacity building initiatives such as DIKSHA, SWAYAM and NISHTHA are adding to the e-learning and digital education programs (MHRD, 2020). However, there is still a major digital divide, particularly in rural and tribal areas, and access to education technology has not become egual (World Bank, 2021).

In the hill districts of Manipur, ICT infrastructure in teacher education institutes (TEIs) that train both pre-service and in-service teachers are also underdeveloped. Many do not have smart

classrooms, stable internet, or any formal digital literacy programs (Anal, 2021). Studies shed light on hurdles like bad infrastructure, teachers who lack training in ICT and have limited access to digital resources, and that these made the NEP 2020 ICT vision hard to realise (Nasreen & Chaudhary, 2018). Furthermore, most of the teachers in these regions are not digital literacy experts; hence, they cannot utilize e-learning tools and digital platforms efficiently (Rani & Deswal, 2015).

These districts are strongly lacking smart classrooms and good internet connectivity which negatively impact teacher training and students learning outcomes (Shokeen et al., 2022). Teachers need ICT training in order to properly incorporate technology into their teaching methods; else, students will suffer (Dhal, 2021) Overcoming these challenges is key to meeting the national education goals (Pir & Islam, 2024) in terms of teacher education in rural Manipur.

This research paper will discuss the present status of ICT facilities in the teacher education institutes of Manipur, challenges to their adoption and some measures for bridging the digital divide. Providing equal access to ICT resources and the right type of digital training for teachers is key for better quality and equity in teacher education in remote areas.

2. RATIONALE OF THE STUDY

There is research that shows this positive belief in relation to ICT in student-teachers in specific educational environments. The studies conducted by Kaur (2011), Angadi (2012), Agarwal and Ahuja (2013), and Padmavathi (2016) indicate that student-teachers are of the opinion that ICT can make them more effective and engaging teacher. But in the case of rural areas (Manipur) major challenges still exist (Anal, 2021) like lack ICT infrastructure, trained teachers, lack of ICT specific curricula (Nasreen & Chaudhary, 2018).

Considering all such gaps, it is necessary to carry out a detailed investigation in teacher education institutes of hill districts of Manipur regarding the existing status of ICT facilities. Gaining insights on these barriers and level of access to digital means in these institutes can be of great importance for policymakers, teacher educators and stakeholders. The study attempts to explore these challenges and suggest ways to bridge the digital divide and align teacher education in Manipur with the vision of NEP 2020 and the changing landscape of digital pedagogy.

3. LITERATURE REVIEW

Several studies have been conducted on ICT for teacher education through student-teachers' perceptions, institutional problems, and digital infrastructure. It finds ICT adoption in teacher education institutions, especially in rural and underdeveloped contexts, has been a topic of several others research.

3.1 Perceptions of Student-Teachers about ICT

Many studies show evidence for positive attitudes towards ICTs among student-teachers. The results also showed that student-teachers feel that ICT plays an important role in improving the way teaching and learning is carried out, and that no significant differences were observed with

regard to gender, location or the academic background of the student-teachers (Kaur, 2011; Angadi, 2012; Agarwal & Ahuja, 2013; Victor, 2013).

Yet, demographic differences in ICT usage has noted on some studies. Only male and urban students had a favorable attititude than female and rural students which is due to the better exposure to the technology (Brindhaman & Manichander, 2013 and Sankar, 2015). Colleges that were aided provided better access to ICT, and thus students in aided colleges had more confidence in their subjects than students in government institutions (Rani & Deswal, 2015; Sekar & Lawrence, 2015).

In contrast, Nwoke et al. There is existing literature that indicates that ICT perceptions were shaped more by institutional support and ICT training opportunities than structural, gender differences (2017). Similarly, Mulay et al. (2018), Choudhury (2018) and Gaurav et al. (2018) further illustrated how ICT is becoming more widely acknowledged among disciplines, representing a call for digital literacy to be integrated across teacher education.

3.2. Challenges of ICT adoption in Teacher Education

General perceptions may be positive, but numerous studies reveal significant barriers to integrating ICT in teacher education.

Infrastructure Constraints: As per Nasreen & Chaudhary (2018) and Anal (2021), inadequate digital infrastructure, poor internet connections, and a lack of ICT integrated course curricula are significant limitations, especially for rural teacher education institutes.

Inadequate Faculty Training: Padmavathi (2016) and Dhal (2021) stressed that pre-service teachers are not thoroughly trained in ICT, which in turn adversely affects their capacity to apply technology-enhanced instruction. Students who had ICT related exposure were found to be more confident in using a digital tool for learning: Bhuvaneswari & Dharanipriya, 2020

Existing Institutional Inequalities: According to Vanan & Rani (2020), aided colleges had superior ICT resources as compared to self-financed institutions resulting in unequal access to technology. For example, Pir & Islam (2024) reported that government employed teacher educators had better access to ICT than private practitioners because of institutional level support and organized training programs.

3.3 Information and Communication Technology (ICT) and Teacher Education under NEP 2020

The National Education Policy (NEP) 2020 highlights the need for ICT-driven teacher training, digital platforms, and blended learning (Ministry of Education, 2020). However, due to infrastructure and training divides, the ICT goals of NEP 2020 are difficult to achieve in many teacher education institutes, particularly located in remote areas.

According to Dhal (2021), using ICT in teaching and learning fosters learner-centered teaching as well as enhances access and engagement. Shokeen et al. (2022) concluded that diverse educational contexts require culturally appropriate digital content for inclusive ICT adoption. Anal (2021) suggested hiring ICT faculty, reviewing curricula to include digital skills, and expanding ICT Infrastructure investment. A serious need for structured ICT training

programs, for both pre-service and in-service teachers, for effective digital classroom integration was highlighted by Pir & Islam (2024). It points out the need of developing faculty to embrace technology, provide institutional support and develop locally relevant digital content. Although ICT is now globally considered an effective driver in teacher education, disparities in the learning environment, low level of training and implementation of policies stand in the way of its effective adoption. The gap could be bridged if the institutions established ICT training, audited digital infrastructure and invested in policies for ICT.

This study extends and expands on these ideas by investigating ICT facilities of teacher education institutes located in the hill districts of Manipur, discerning the various barriers, their root causes and recommending ways to assist increased adoption of ICT in teacher training.

4. RESEARCH OBJECTIVES

This study aims to assess:

- The present condition of ICT facilities in teacher education institutions.
- To find out the challenges of ICT integration in Teacher Education.
- Evaluate how digital infrastructure gaps affect teacher education aligned with NEP 2020.
- Suggest policies to improve digital divide and ICT uptake in teacher education.

5. RESEARCH QUESTIONS

- This study examines the following questions to attain the aforementioned objectives:
- What is the present extent of ICT integration in teacher education institutions in the hill districts of Manipur?
- What are the primary infrastructural, pedagogical, and policy-related obstacles to the introduction of ICT in teacher training?
- What is the effect of the digital divide on teacher training outcomes in the region?
- What initiatives may be implemented to improve ICT preparedness among teacher educators and student-teachers?

6. RESEARCH METHODOLOGY

This paper looks into the status of ICT facilities, challenges and opportunities for the five District Institutes of Education and Training (DIETs) in hill districts of Manipur. It employs a census-based sampling technique on 38 teacher educators, and 8 principals and proportional sampling on students by selecting 250 from 500 students. Surveys, interviews, and observational techniques are used to collect data. While surveys provide ICT access, usage, and challenges, interviews with principals explore institutional ICT policies. Observational checklists confirm ICT facilities such as smart classrooms, internet access, and e-learning resources. Data is analysed through descriptive statistics and thematic analysis.

7. RESULT AND DISCUSSION

This section focuses on the results of five of the DIETs located in the hill districts of Manipur (Chandel, Churachandpur, Tamei, Senapati, and Ukhrul).The results have been analyzed in line with the research aims and questions of the study, assessing the state of ICT facilities, several key challenges, implications for teacher education, and possible solutions.

The present condition of ICT facilities in teacher education institutions.

The study also shows that ICT Resource centers exist in all five DIETs, which can be seen as an institutional acceptance of the role of ICT in teacher education. But, the quality, access, and utilization of ICT infrastructure is still patchy.

7.1. Availability of ICT Facilities

Smart Room facilities: The absence of interactive whiteboards, multimedia projectors, and digital learning tools is limited due to the lack of Smart Room facilities.

Internet Connectivity: Only DIET Senapati has a dedicated internet connection, indicating infrastructure differences. The internet-free four DIETs deprive teachers and students of e-learning, online training programs, and research activities.

Wi-Fi: No DIET has campus Wi-Fi. This restricts further digital engagement between student teachers and faculty and makes collaborative and self-paced learning challenging.

For the faculty members ICT: None of the DIETs have structured training practices in ICT, which prevents teacher educators from developing effective use of ICT in their teaching.

E-Learning Resources: No DIET provides e-learning platforms like Moodle, SWAYAM, or DIKSHA, denying student-teachers of digital content, online modules, and virtual learning.

WhatsApp Groups for Teaching and Learning: All the DIETs make use of WhatsApp groups in an informal manner as an inexpensive digital tool for learning. It is one avenue for sharing information, resources and collaborative discussions.

Power Backup: None of the five DIETs have power backup facilities. ICT-based learning activities are currently interrupted by frequent power cuts that have diminished people's penchant for digital engagement.

7.2. To find out the challenges of ICT integration in Teacher Education.

Infrastructure Challenges:

Weak ICT Infrastructure: The lack of smart classrooms, e-learning platforms, and ICT teacher training pose barriers to transitioning to digital teaching.

Internet Connectivity: More than 80% of the DIETs do not have proper internet connectivity which limits e-learning, research and professional development activities.

Lack of Power Backup Facilities: Even electricity failure makes it impossible to use the ICT. Digital tools cannot be relied upon for daily academic activities.

Pedagogical Challenges

Absence of ICT Training for Faculty: Teacher educators are not receiving any training in digital pedagogy and therefore unable to adopt ICT based teaching methods.

Restricted exposure to digital practices for student-teachers: The absence of e-learning resources, online evaluations, and interactive learning materials result in student-teachers graduating with hardly any ICT abilities, impeding their ability to utilize technology in actual classrooms.

Policy and Administrative Challenges

Absence of an Institutional ICT Policy: The DIETs are characterized by unestablished ICT policies, resulting in uneven implementation and funding challenges for the development of digital infrastructure.

ICT Implementation: The digital divide between urban and rural areas is obvious since case studies show that DIETs in rural hill districts face more obstacles in ICT implementation with less government and private sector intervention than in urban teacher education institutes (TEIs).

7.3. Evaluate how digital infrastructure gaps affect teacher education aligned with NEP 2020.

The lack of ICT resources and digital training in DIETs adversely impacts the quality of teacher education and the readiness of pre-service teachers.

Lack of Exposure to Digital Teaching Approaches: Since student-teachers do not get hands-on experience in implementing ICT tools, they are incapable of implementing any technology-integrated lesson plans in schools.

Limited Professional Development for Faculty: When teacher educators cannot get trained and cannot access the digital learning platforms, they cannot keep their knowledge base updated and are unaware of modern teaching trends.

Hurdle to Implementing NEP 2020 Policy: The NEP 2020 advocates for the integration of digital tools in teacher education, but DIETs suffer from ICT shortcomings that hinder successful implementation of such a policy.

7.4 Suggest policies to improve digital divide and ICT uptake in teacher education.

The following measures are recommended to bridge the digital divide and improve ICT integration in the Teacher Education Institutes:

7.4.1 Infrastructure Development

Establish Smart Classrooms: Equip them with interactive whiteboards, projectors, and digital tools to modernize teacher training.

Enhance Internet Connectivity: DIETs centre should be equipped with broadband/Wi-Fi facilities so they can be used for e-learning and research.

Implement Power Backup Solutions: The installation of solar-powered systems or backup generators can provide continuous access to ICT resources.

7.4.2 Professional Development and Capacity Building

Implement ICT Training for Teacher Educators: Structured digital literacy programs for faculty will help in the integration of technology through pedagogical shifts.

Promote Faculty Engagement in Online Courses: Institutions ought to collaborate with platforms such as SWAYAM and DIKSHA to offer educators online professional development programs.

7.4.3 Improving student-teachers digital skills

Access to E-Learning Resources: DIETs also need to provide online learning platforms (Moodle, SWAYAM, DIKSHA) so as to bring the student-teachers up to speed with digitised teaching.

Conduct ICT Workshops and Hands-On Training — ICT training sessions should be held regularly to improve student-teachers' digital teaching abilities.

7.4.4 Policy and Administrative Recommendations

Formulate an Institutional ICT Policy: Each DIET must establish an ICT implementation strategy that delineates finance strategies, infrastructure development, and training initiatives. The state government should collaborate with EdTech firms and NGOs to facilitate ICT adoption in rural teacher education institutions. Prioritize augmented budget allocations for digital infrastructure in teacher training institutes under the implementation plans of NEP 2020.

8. DISCUSSION

The application of Information and Communication Technology (ICT) in teacher education has become one of the key aspects to develop teacher education as a modernity aspect and ensure the teacher with better teaching pedagogy and digital literacy. However, a study based on five District Institutes of Education and Training (DIETs) from hill districts of Manipur indicates pronounced deficits in infrastructure, a lack of faculty training opportunities, and little digital resources. All of these factors hinder the achievement of the vision of ICT-based teacher education as envisaged in the National Education Policy (NEP) 2020.

Although ICT Resource Centers exist in every single DIET, they are of limited use with poor digital infrastructure. While DIET Senapati maintains a stable internet connection, other DIETs lack stable internet access, due to being located in rural areas with weak or even absent digital infrastructure. Smart classrooms, power backup, Wi-Fi are missing, making it even more challenging. Other studies support this, such as Nasreen & Chaudhary (2018) and Rani & Deswal (2015) which highlight the ongoing urban-rural digital divide affecting equal access and opportunities with ICT in education and ICT under considerations.

Since there hasn't been any concrete training in ICT for most of them, ICT adoption is not possible. None of the DIETs provide workshops or professional development programs on a regular basis supporting the findings of Shokeen et al. (2022), underscore that a lack of proper

ICT training is a significant obstacle to rural teacher education. In the absence of an adequate preparation, educators find it difficult to integrate the technology, thus restricting student-teachers from experiencing ICT-enhanced instructional strategies in the classroom.

And, there are also no digital learning platforms in place such as — Moodle, SWAYAM, and DIKSHA which confines student-teachers to self-paced learning. According to Dhal (2021), future teachers are unable to develop these skills, as they have limited access to e-learning tools. Although WhatsApp Groups can be used as a non-formal approach for communication, but it does not have the modality of formal Learning Management Systems (Patel & Rana,2020).

A major challenge is the absence of an institutional ICT policy as well as insufficient government funding and close private-sector partnership. Moreover, the other policy gaps highlighted by Pir & Islam (2024) reveal that rural teacher education institutions face systemic inefficiencies in the application of ICT. In the short term, targeted investments in digital infrastructure, faculty training protocols and policy reforms are required to address these challenges. Enhancing ICT adoption in DIETs is imperative, as future teachers will need to possess the appropriate skills to fully integrate technology into their classrooms.

9. IMPLICATION

Some major initiatives are required to enhance the use of ICT in DIETs and in accordance with NEP 2020. Strengthening ICT Infrastructure A smart classroom equipped with digital tools, good internet connectivity, and Wi-Fi access is essential for effective adoption of ICT. It is necessary to install reliable power backup solutions to avoid disruption in learning.

Faculty Training and Capacity Building Teacher educators need structured ICT training to develop skills of digital pedagogy. It is recommended to facilitate online courses like SWAYAM, DIKSHA, NISHTHA along with favourable disposition towards continual ICT workshops to improve information and communication technology(ICT) skills. Access of e-learning platforms should be a part of the teacher training. Blended learning will also enhance the uptake of technology with its mixture of traditional pedagogy and digital experiences. Additionally, emphasis must be laid on developing local-language digital content to enhance accessibility.

A structured ICT policy is mandatory to serve as foundation for integrating technology in DIETs. Each of these efforts will facilitate the adoption of ICT through increased government funding and partnerships with EdTech companies, NGOs, and digital education initiatives.

10. CONCLUSION

With the integration of information and communications technology (ICT), teacher education can be revolutionized, making the learning process more interactive and accessible. DIETs in hill districts of Manipur, on the other hand, suffer from major bottlenecks: weak infrastructure, untrained faculty and absence of ICT policies. These gaps, if not addressed urgently, will only broaden the digital divide, crippling the realisation of NEP 2020's ICT goals.

Strengthening Integration of ICT Investment in smart classrooms, high-speed internet and e-learning resources. Smart classrooms won't work without proper faculty and student-teacher training. The findings highlight the role of institutional ICT policy, the impact of government investment and public-private partnerships in the ongoing sustainable adoption of ICTs in DIETs. DIETs can provide requisite infrastructure, training and policy support towards equipping student-teachers with basic digital competencies. It will thus help address the digital divide and modernise teacher education in Manipur's hill districts, that will ensure future educators are equipped to meet the challenges of digital classrooms.

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