

Access, use and integration of Information and Communication Technology among government school teachers of Jorhat district, Assam: A status study on trends and problems

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Abstract

This study examines the level of access, use and integration of ICT tools in the teaching-learning process among government school teachers of the Northwest education block in Jorhat district, Assam. Though a large number of teachers own a smartphone, few use it for the teaching-learning process. The use of online resources, particularly, Open Educational Repositories, is relatively high. There is no significant difference between male and female teachers in access and use of ICT in teaching-learning process. However, it is seen that access and use of ICT are higher among younger teachers and teachers with higher educational qualifications while older teachers and teachers with relatively lower educational qualifications are less likely to use ICT in the classroom. Surprisingly, SC/ST-dominated areas are doing much better than urban and rural areas in terms of using ICT tools in classrooms. Lack of proper infrastructure in classrooms, low technical awareness and poor network are some of the major challenges faced by teachers in integrating ICT tools in the classroom.

Keywords: DIKSHA portal, QR codes, Open Educational Resources, SWAYAM, ICT, NISTHA

Introduction

The rapid and explosive growth of information and communication technology (ICT) has transformed the traditional boundaries of work, education, and leisure. Today, it holds the potential to transform the entire process of schooling from pedagogy and teachers' training to administration and governance of institutions (Ali, 2019; Singh, 2019). It enhances the teaching-learning process by enabling a student-centric teaching-learning process through meaningful use of ICT (Castro Sánchez and Alemán, 2011). It improves the quality of education and efficiency of delivery by providing teachers and students autonomy and a creative teaching-learning environment

(Chai, Koh and Tsai, 2010; Lowther et al., 2008; Serhan, 2009). It opens new channels for collaborative learning and distance education (Koc, 2005). It can redistribute knowledge by expanding access to information and help in the development of critical thinking skills (Brush, Glazewski and Hew, 2008; McMahon, 2009).

The use of ICT in school education has received a massive boost in recent years, significantly driven by government initiatives. They include online resources platforms such as the DIKSHA portal and app, the inclusion of QR codes in textbooks, Direct-to-Home TV channels and teachers' training programmes such as NISTHA. Samagra Shiksha scheme has been aligned with New

Education Policy 2020 to promote digital initiatives such as virtual classrooms and smart classrooms. Further, the low cost of smartphones and internet data have massively increased access to ICT devices. More recently, online learning has emerged as the most influential alternative to conventional education during the COVID-19 pandemic.

Meaningful integration of ICT in school education has become an important topic in research on educational reforms. It is seen that mere access to ICT tools is not enough. Rather, they should be embedded in powerful and interactive learning environments with respect to pedagogy, curriculum and school organisation (DEETYA, 1996). In this regard, teachers need to act as catalysts for meaningful integration of ICT by introducing new technologies, establishing innovative teaching-learning practices and developing the right attitude and values towards new technology in students (Watts-Taffe, Gwinn and Horn, 2003). Studies have shown that teachers with prior experience, technical knowledge and personal enterprise have a positive impact on the innovative use of ICT and the digital habits of their students (Drent and Meelissen, 2008; Peralta and Costa, 2007). Thus, teachers play a critical role in inculcating the use of digital habits in students and classrooms and ensuring meaningful integration of ICT in school education. As such, access to and awareness about ICT tools and resources among teachers is important for the use and integration of ICT in teaching-learning process. Access to smartphones and computers, level of awareness about online resources and use of digital tools in classrooms among the teachers are good indicators of the overall state of using ICT in the teaching-learning process in schools. An ICT-ready workforce is central to meaningful use and successful integration of ICT in the teaching-learning process. This

study aims to study the state of ICT integration in the teaching-learning process in government schools. Though much work has been published on this theme, studies on the status of ICT integration in schools of the Northeast Indian states such as Assam remain underrepresented.

Objectives

Considering the above facts, this study examines the present scenario of using ICT in the teaching-learning process among government school teachers in the Jorhat district with the following objectives-

- To find out the level of access, use and integration of ICT and e-learning material in the teaching-learning process (TLP) by government school teachers.
- To examine whether there is any difference among male and female teachers in access, use and integration of ICT in the TLP.
- To examine whether there is any difference among different age groups of teachers in access and use of ICT in their teaching-learning process.
- To examine whether there is any difference in the level of access, use and integration of ICT in the TLP among teachers with different levels of educational qualification.
- To examine whether there is any difference among teachers from urban, rural and SC/ST-dominated areas in the integration of ICT tools in classrooms.
- To identify the major issues and challenges faced by the teachers while integrating ICT tools in their classrooms.

Methodology

This study uses a normative survey research method. It is oriented towards examining the present scenario of using ICT in the teaching-learning process among government school teachers in the Northwest educational block of the Jorhat district, Assam. The normative survey method allows the collection and analysis of data obtained from a large number of respondents representing specific populations to study the conditions that currently exist and the trends that are developing (Aggarwal, 1966).

North West educational block of the Jorhat district in Assam was purposefully selected as the unit of sampling for the present study. The area has a sizable number of schools in rural areas and SC/ST-dominated areas that experience an interesting juxtaposition. On one hand, such areas tend to gain the most out of ICT integration in the teaching-learning process, giving them access to vast amounts of information, enhanced pedagogy practices and better learning outcomes. On the other hand, integration of technology in the classroom and use of digital resources are still limited in these areas, depriving large numbers of teachers and learners of the benefits of access, use and integration of ICT. In such a scenario, teachers play a very important role in introducing new technologies, imparting digital skills to students and motivating students to use ICT in a meaningful way.

The schools in the selected block are categorised into three categories according to their respective location: urban areas, rural areas and SC/ST dominated areas including tea gardens. From each of these categories, 10 per

cent of schools are randomly selected. A sample of 10 per cent are selected from the teachers of these schools by using snowball sampling and their access, awareness and integration of ICT in the teaching-learning process are examined. Data is collected through unstructured interviews and observation tools. Unstructured interviews are conducted with teachers as well as principals, students and parents. Questionnaires are also used to seek information about students' and parents' perception towards use of ICT in the classroom and in the teaching-learning process. Further, an observation schedule is followed to see the actual conduct of the ICT-based activities.

Results and Discussions

The statistics recorded gives a comprehensive view of access, awareness and integration of ICT in teaching-learning process by government school teachers in the Jorhat district, Assam. The study surveys 270 teachers. Among them, 110 are males and 160 are females. The teachers can also be categorized based on qualification. 44 of them have cleared HSLC and 112 HSSLC while 94 teachers have completed graduation and 20 have completed post-graduation. 24 teachers are less than 30 years old while 100 teachers are in the age group 30-40 years. Further, 64 and 82 teachers belong to the age-groups 40-50 years and 50-60 years, respectively.

Survey of teachers who own smartphones and other devices and use online resources including the DIKSHA platform, QR Codes in textbooks and Open Educational Repositories

Table-1: Number of teachers who have access to smartphones and computers and use them in teaching-learning process

Own smartphone	Number of teachers (%)	Access to computers	Number of teachers (%)	Using smartphones in TLP	Number of teachers (%)
Yes	242 (89.63%)	Yes	46 (17.03%)	Yes	112 (41.48%)
No	28 (10.37%)	No	224 (82.97%)	No	158 (58.52%)
Total	270	Total	270	Total	270

It is inferred from Table-1 that only 17.03 per cent of the teachers have access to computers. But a huge majority (89.63 per cent) has access to smartphones.

Yet, the use of smartphones in the teaching-learning process is limited to only 41.48 per cent of the teachers.

Table-2: Number of teachers who use the DIKSHA platform, QR Codes in textbooks and Open Educational Repositories (OER)

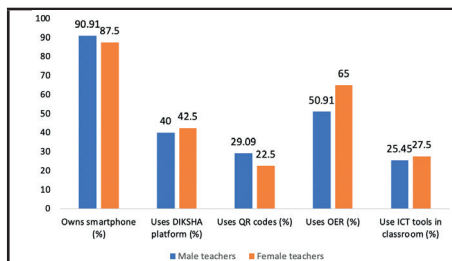
Using DIKSHA platform	Number of teachers (%)	Using QR codes	Number of teachers (%)	Using OERs	Number of teachers (%)
Yes	112 (41.48%)	Yes	68 (25.19%)	Yes	160 (59.26%)
No	136 (50.37%)	No	142 (52.59%)	No	76 (28.15%)
No response	22 (8.15%)	No response	60 (22.22%)	No response	34 (12.59%)

It is inferred from Table-2 that only 25.19 per cent of the teachers use the QR code printed in textbooks. Further, only 41.48 per cent of teachers use the DIKSHA platform which can be accessed through the app or portal. Though these features are used only by a minority,

a large number of teachers (59.26 per cent) use other Open Educational Repositories (OER).

Gender-wise distribution of teachers who own smartphone and use online resources in teaching-learning process

Figure-1: Gender-wise distribution of teachers who own smartphone and use online resources in teaching-learning process including integration of ICT tools in classrooms

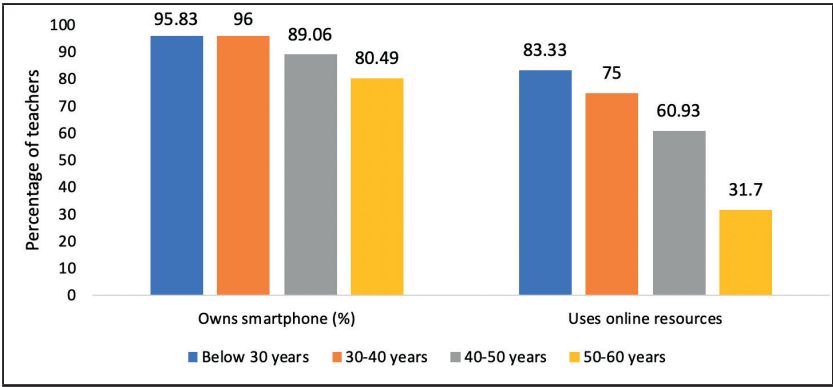


It is inferred from Figure-1, that from the sample of 110 males and 160 females, 90.91 per cent of male teachers and 87.50 per cent of female teachers have access to smartphones. However, only 40 per cent of male teachers and 42.50 per cent of female teachers use the DIKSHA platform. Further, only 29.09 per cent of male teachers and 22.50 per cent of female teachers use the QR codes printed in the textbooks. Integration of ICT in classrooms by both male and

female teachers is as low as 25.45 per cent and 27.50 per cent respectively. However, a large number of both male teachers (50.91 per cent) and female teachers (65.00 per cent) utilize OER. Thus, the difference in access and use of ICT and online resources between the two genders is insignificant.

Age-wise distribution of teachers who own a smartphone and use online resources in teaching-learning process

Figure-2: Age-wise distribution of teachers who own smartphones and use online resources

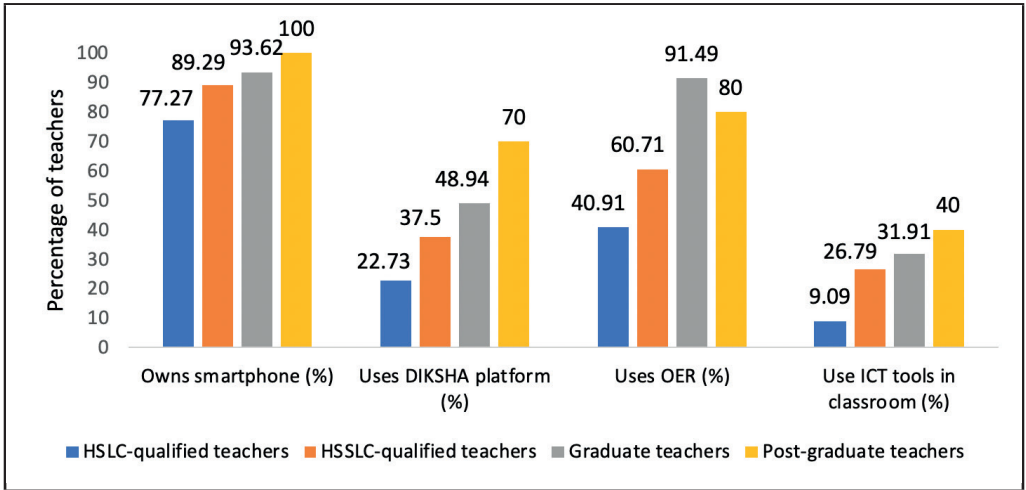


It is inferred from Figure-2 that 95.83 per cent of teachers who are below the age of 30 years have access to smartphones while 83.33 per cent of them use online resources like the DIKSHA platform, QR codes in textbooks and other Open Educational Repositories. 96 per cent of teachers in the age group 30-40 years and 89.06 per cent of the teachers in the age-group 40-50 years have access to smartphones. However, only 75 per cent and 60.93 per cent of them, respectively use online resources. Among the teachers in the age group

50-60 years, access to smartphones is relatively low (80.49 per cent) while use of online resources is much lower at 31.70 per cent compared to other age groups. Thus, access and use of ICT are higher among younger teachers while older teachers are less likely to have access to smartphones and use online resources.

Qualification-wise distribution of teachers who own smartphone and use online resources in teaching-learning process

Figure-3: Qualification-wise distribution of teachers who own smartphone and use online resources



It is inferred from Figure-3 that only 77.27 per cent of teachers who have qualified High School Leaving Certificate (HSLC) examination have access to smartphones. In comparison, 89.29 per cent of teachers who have qualified for the Higher Secondary School Leaving Certificate (HSSLC) examination have access to smartphones. The proportion of graduates (93.62 per cent) and post-graduates (100.00 per cent) having access to smartphones are even higher.

Similar trends can be seen in the use of online resources. The use of online resources among HSLC-qualified and HSSLC-qualified teachers is relatively low. Only 22.73 per cent of HSLC-

qualified teachers and 37.50 per cent of HSSLC-qualified teachers use the DIKSHA platform. Similarly, the use of OER is also low among them (40.91 per cent and 60.71 per cent, respectively). In comparison, 91.49 per cent of graduate teachers and 80.00 per cent of post-graduate teachers use OER. Similarly, use of the DIKSHA platform is also much higher (48.94 per cent and 70.00 per cent respectively).

Thus, teachers with higher qualifications are more likely to have access to smartphones and use online resources.

Location-wise distribution of teachers using ICT tools in classrooms.

Table-3: Location-wise distribution of teachers using ICT tools in classrooms

Location of the teacher	Number of teachers (%)	Teachers using ICT tools in classrooms (%)
Urban	30 (11.11 %)	26.67 %
Rural	217 (80.37 %)	23.96 %
SC/ST dominated	23 (8.52 %)	60.86 %

From Table-3, it is inferred that only 26.67 per cent of urban teachers have integrated ICT tools in the classroom holistically. A similar trend is seen in rural areas where only 23.64 percent

of teachers have integrated ICT into the classroom. However, 14 out of 23 teachers from SC/ST-dominated areas have successfully integrated ICT into their classrooms.

Major challenges faced by teachers in integrating ICT tools in the classroom

Figure-4: Major issues raised by teachers that hamper integration of ICT tools in the classroom

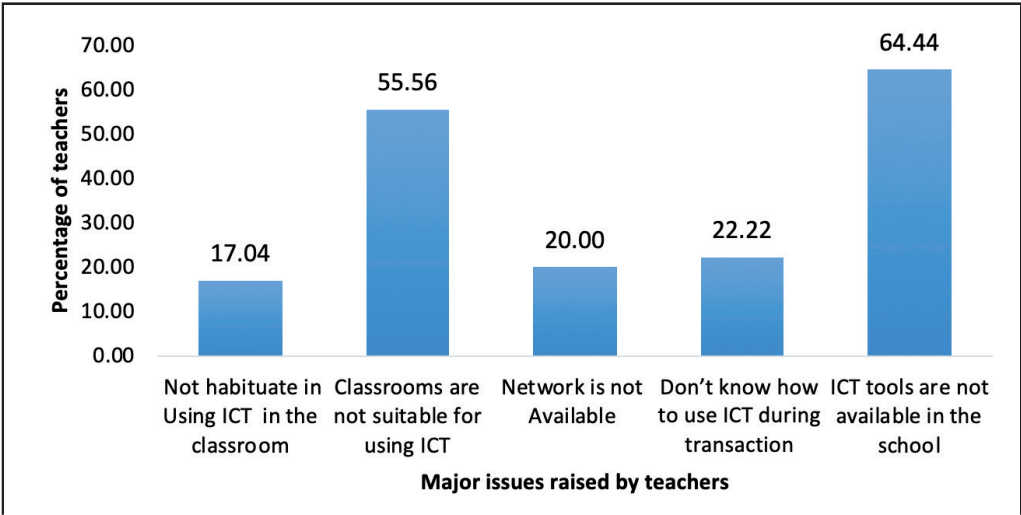


Figure-4 shows the major issues faced by teachers in integrating ICT in classrooms. The issue of lack of ICT tools in the school is raised by 64.44 per cent of the teachers. Further, the majority of teachers (55.56 per cent) feel that classrooms are not well furnished for using ICT tools. Other commonly raised issues are lack of awareness to effectively use ICT during teaching-learning process (22.22 per cent), poor network (20 per cent) and not habituated to using ICT in the classrooms (17.04 per cent).

Conclusion

The following conclusions can be drawn from the results and discussion:-

- Though a large number of government school teachers own a smartphone (89.63 per cent), few use it for teaching learning processes (41.48 per cent).
- Only a small proportion of teachers have successfully integrated ICT in classrooms (26.66 per cent), QR Codes (25.19 per cent) and DIKSHA

Platform (41.48 per cent). However, the use of online resources, particularly, Open Educational Repositories, is relatively high (59.26 per cent).

- The difference between male and female teachers in access and use of ICT in the teaching-learning process is insignificant. Important trends are seen in terms of age and qualification of teachers. Access and use of ICT are higher among younger teachers and teachers with higher educational qualifications while older teachers and teachers with relatively lower educational qualifications are less likely to use ICT in the classroom.
- Surprisingly, teachers in SC/ST-dominated areas (60.86 per cent) are doing much better than those in urban areas (26.67 per cent) and rural areas (23.96 per cent) in terms of using ICT tools in classrooms.
- Lack of ICT tools in schools (64.44 per cent), low technical awareness (22.22 per cent) and poor network

(20 per cent) are some of the major challenges faced by teachers in integrating ICT tools in the classroom.

There is no doubt that, in the twenty-first century, ICT-based teaching-learning processes will enhance the outcome of education. To take advantage of that, access to ICT tools and resources is indispensable but not enough by itself. It is crucial that teachers are well-versed with digital skills, ICT-ready and develop the right attitude towards ICT for they not only deliver lessons, but also introduce new technology to students, foster the right attitude towards ICT in them and impart them the digital skills. In this regard, the findings of this study have significant implications for the integration of ICT in teaching-learning process in the government schools of Assam.

Firstly, a robust teachers' training programme such as NISTHA is the need of the hour. E-courses and ICT tools can be utilized to conduct such programmes at regular intervals. It will make the professional development of teachers a life-long journey. Studies have shown that training programmes have a positive impact on the digital skills of teachers (Shanmugaraja, Karthikeyan, & Jayaraman, 2012; Gupta, 2019). As seen above, certain categories of teachers such as those with relatively lower educational qualifications or belonging to older age-groups are less likely to use ICT tools in the teaching-learning

process. Such teachers may undergo special training to develop digital skills required to successfully integrate ICT tools in classrooms.

Further, an incentive system to motivate teachers for integration of technology has shown positive results (Atabek, 2019; Stecher et al., 2018). Adequate training and performance-based incentives enabled through technology will make the experience of using technology an enjoyable one and motivate teachers to actively integrate ICT in a way that is meaningful and relevant for the students.

Finally, the roadmap to meaningful use and successful integration of ICT in teaching-learning process should take into account the infrastructural hurdles, lack of digital skills and socio-economic, cultural and demographic factors. Radio and television followed by smartphones are the most widely available ICT devices. Initiatives such as SWAYAM Prabha DTH TV channels, QR Code and DIKSHA App are appropriate initiatives focussed on integrating of low-level of ICT in appropriate context rather than ineffectively using complex technologies in teaching-learning process and compromising learning outcomes (Reich, Rooney, & Lizier, 2020). Use and integration of ICT in the teaching-learning process is not an event, but a journey from low technology solutions to a holistic technology-driven teaching-learning ecosystem.

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