Digital Literacy among Student Teachers in Nagaland, India: A Demographic Analysis

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ABSTRACT Technology can be utilized to achieve multiple objectives in education and digital literacy of teachers is highlighted as the key to improve educational outcomes. The present paper aims to find out the difference in digital literacy among student teachers based on their socio-demographic profiles viz. gender, management, type of teacher trainee, and type of family. The study adopted a descriptive survey method on a sample of 200 second semester student-teachers from 8 B.Ed. institutes of Nagaland which were drawn through simple random sampling technique. The data was collected through a standardized tool on digital literacy developed by Singh. The findings of the study revealed a significant difference in digital literacy among student teachers based on gender. However, in respect of management, type of teacher trainee and type of family, no significant difference was reported. Furthermore, it is expected that the findings of the study will help teacher education institutions to increase awareness on importance of digital literacy among student teachers.

INTRODUCTION

Technology has undoubtedly influenced many lives in every aspect, and education is no exception. It has manifested profound modification in the teaching and learning process as access to digital media has increased exponentially where new opportunities and challenges continue to evolve in the education sector (Zhihui et al. 2017). Wang and Zhao (2021) found that attitude and support of educators played a critical role in the success of integrating technology into educational programs, and attitudes toward technology could have a substantial impact on teachers' development of ICT abilities. In this regard, empirical findings also revealed that pre-service teachers' data literacy and digital teaching competency might be improved by encouraging a positive mindset toward technology, technology operations, and technology ethics

(Chu et al. 2023). Various education commissions and policies in India such as – NEP 2020, NCFTE 2009, and NCF 2005 have highlighted the use of digital resources in the teaching learning sector. NEP (2020) also endorsed using technology in education, aiming toward digitally equipped classrooms where it proposed to set up the National Education Technology Forum (NETF) under the National Mission on Education. It has also recommended that technology and pedagogical integration are vital in bringing improvements and transformation of educational outcomes.

The concept of 'digital literacy' was first seen in the works of Zurkowski (1974, as cited in Gutiérrez-Ángel et al. 2022) where it is comprehended as an ability to identify, locate, and examine information. Over the years the concept continues to evolve as evident from various literary sources. Lanham (1995, as cited in Feerrar 2019) used the term digital literacy interchangeably with multimedia literacy and described it as an "ability to understand information, however presented". Gilster (1997 as cited in Spante et al. 2018) defines digital literacy as the "ability to understand and use information in multiple formats through computer". Gutiérrez-Ángel et al. (2022) relate digital literacy

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with reading, writing, calculation skills and effective use of technology in any situation. Different interrelated literacy framed digital literacy emphasizing on digitally mediated information; multimedia literacy; and computer literacy (Feerrar 2019). In this paper the concept of digital literacy has been understood from the usage and knowledge of computer or technology, where critical users understand the 'know how' and 'know what' of technology. Spante et al. (2018) in their reviewed article also indicated the "know-how" of digital literacy as an 'ability to understand and use information in varied ways through computer.' The 'know how' of technology includes those technically agile users who have the knowledge to handle, operate, manage, adopt and use computer hardware like desktops, printers, OHPs, interactive boards along with application and selection of various e- learning tools – google classroom, e-patshala, Diksha, swayam, Google Meet, Skype etc. that are integrated into a techno pedagogical classroom. Whilst the 'know what' of technology relates to critically skilled users who carefully evaluate, analyse, and select relevant information through varied sources of network. It connotes similar terms such as skill- based understanding and skill adaptation as argued by Spante et al. (2018). Sharma and Sharma (2022), also asserted that a digitally literate person knows how, where and when to select and use the digital technologies in a purposeful way. Thus, the concept of digital literacy is varied and comprehensive in nature. It is defined as the knowledge, skills and ability to handle and manipulate any digital apparatus/equipment and make informed judgments about the effective utilization of digital tools in today's ICT based classroom. In the paper digital literacy has been understood in the context of how student teachers through their knowledge, ability, understanding, and skills access various available ICT resources in their techno pedagogical practices for effective educational outcomes and learning.

Ilyas (2020) highlighted the importance of digital literacy related components in school education for developing the required skills and competencies in a digital based classroom. It also recommended that comprehensive in-service training programs should be organized by all stakeholders not just to provide teachers with digital tools but to bring a change in their perspective which at times is a barrier towards the usage of digital tools

in the classroom. Technology aids in designing new learning environments where it meets the needs of teaching and learning by using digital tools (Cervera and Caena 2022). According to Pangrazio and Sefton-Green (2021), research indicates that schools need to develop digital literacy and extend across different contexts to develop critical, ethical, and technical mastery. Chan et al. (2017), in their study incorporated digital storytelling as an approach to help engage and motivate students to learn digital literacy skills. The result of the study showed that three students improved digital literacy skills in three aspects – digital competence, digital usage and digital transformation regardless of their prior knowledge and levels of digital literacy. Ervianti et al. (2023) aimed to determine the influence of digital literacy on the learning outcomes of students and concluded that the use of digital literacy is significant for student learning outcomes. Technologies have the potential to transform education by redistributing resources, increasing chances to practice, supplementing instructional time and personalizing instruction (UNESCO Global Education Monitoring Report 2023). According to UNESCO Global Education Monitoring Report (2023), a study over the past two decades on technology's impact on learning found small to medium positive effects on learning outcomes compared to traditional instruction. For example, three recent meta-analyses (Chauhan 2017; Hillmayr et al. 2020; Kärchner et al. 2022 as cited in UNESCO Global Education Monitoring Report 2023) in their review studies at various education levels in various countries had found an average positive impact of medium size on learning outcomes through technology. The report suggested separate evaluations of individual types of technology-based learning intervention. A normative survey of 181 pre- service teachers in Kerala concluded that pre-service teachers had an insufficient perception of augmented reality applications in science learning. It also suggested that pre-service teachers should be sensitized about the appropriate usage of augmented reality applications through training (Anju and Thiyagu 2023). Jamir and Babu (2023) examined the digital competence among school teachers in Nagaland and concluded that the school teachers having less than 2 years were found to have higher Digital Competence than those teachers having more years of work experience. The advantages of digital interventions in education

have been found to be effective leading to effective teaching competency of the B.Ed. students in physical science (Nandhakumar and Govindarajan 2022); additionally blended learning approaches significantly improved students' academic performance (Kumar et al. 2023). Accordingly, UNESCO Global Education Monitoring Report, 2023 supplements that technology 'facilitates positive changes in a sustained way and in diverse contexts', which is evident from comprehensive research but also noted that evidence of success is limited. As various studies highlighted the importance of digital pedagogy it is imperative to know the teacher's ability, knowledge, understanding, and skills on digital literacy that influence and shape educational outcomes. UNESCO Global Education Monitoring Report (2023) also argues that 'positive impact is often dependent on strong pedagogical alignment and teacher input'. Since, several literatures surveyed highlighted the importance of digital literacy in teaching and learning, an attempt has made to understand the digital literacy of student teachers based on certain demographic variables.

Objectives of the Study

1. To find out the significant difference between male and female student teachers in their digital literacy mean scores.
2. To find out the significant difference between government and private student teachers in their digital literacy mean scores.
3. To find out the significant difference between pre-service and in-service student teachers in their digital literacy mean scores.
4. To find out the significant difference between joint family and nuclear family student teachers in their digital literacy mean scores.

Hypotheses of the Study

1. There is no significant difference between male and female student teachers with regard to their digital mean scores.
2. There is no significant difference between government and private student teachers with regard to their digital mean scores.
3. There is no significant difference between pre-service and in-service student teachers with regard to their digital mean scores.

4. There is no significant difference between joint family and nuclear family student teachers with regard to their digital mean scores.

METHODOLOGY

Method

A descriptive survey method was adopted for the present study to fulfill the given objectives. The study was carried out in all the 8 B.Ed. institutes of Nagaland where 2 institutes are managed by the government, and 6 institutes are managed by private entities. The present study aimed to find out the difference in digital literacy scores among student teachers in Nagaland based on their demographic profiles viz. gender, management, type of teacher trainee, and type of family through descriptive statistical techniques such as Mean, SD, and t-test to justify the objectives of the study.

Sample

The population consists of all the student teachers enrolled in all the B.Ed. institutes in Nagaland. Out of the total population (600) the sample constituted 200 student-teachers from all the B.Ed. institutes in Nagaland who were enrolled in second semester. The samples were drawn through a simple random sampling technique through random number method using Microsoft Excel in generating random numbers.

Tools

The tool in the present study comprises a structured questionnaire to gather the demographic profile of the respondents, and a standardized tool on digital literacy developed by Singh (2019) was utilized in the present study. The questionnaire consists of two section – Section-A consisting the demographic profile of the respondents; Section-B on the digital literacy questionnaire. The standardized tool consists of 39 items with five dimensions viz. Participation and understanding of digital practices; Access and integrate information; Critically evaluate information, online interaction and online tools; Manage and communicate information; Collaborate and share digital content. The scale followed a dichotomous survey questions

with a binary options of Yes or No to respond the questionnaire.

Procedure

The data collection was done through face-to-face mode after obtaining prior permission from all the heads of institutions. The researchers gathered the data by visiting all the B.Ed. institutes in Nagaland. During the data collection process all the respondents were informed about the purpose of the study and clear instructions was given on the nature of the questionnaire to acquire accurate data. The data collection was done during working hours at the college and took about 25 minutes to complete each session.

RESULTS

Digital Literacy and Gender

Table 1 showed the digital literacy scores of male and female student teachers. The obtained results indicated mean scores were 31.52 and 29.66 correspondingly with a standard deviation of 6.399 and 6.023, respectively. It can be seen that male student teachers scored higher than the female student teachers in their digital literacy scores. Further, the independent t-test analysis revealed that the calculated t-value of 2.009 is found to be statistically significant at a sig value of 0.046 (two-tailed, $p<.05$). Thus, the null hypothesis which stated there is no significant difference between male and female student teachers with regard to their digital mean scores is rejected and it can be concluded that there is a significant difference between male and female student teachers with regard to their digital mean scores.

Digital Literacy and Management

The obtained results from Table 2 showed the digital literacy scores of government and private student teachers mean scores were 30.66 and 30.15 correspondingly with a standard deviation of 5.570 and 6.370, respectively. It can be seen that government student teachers' and private student teachers' scores varied little in their digital literacy mean scores. Further, the independent t-test analysis also revealed that the calculated t-value of 0.477 is not statistically significant at a sig value of 0.634 (two-tailed, $p>.05$). Thus, the null hypothesis which stated there is no significant difference between government and private student teachers with regard to their digital mean scores is accepted.

Digital Literacy and Type of Teacher Trainee

The obtained results from Table 3 showed the digital literacy scores of pre-service and in-service student teachers mean scores were 30.18 and 31.36 correspondingly with a standard deviation of 6.179 and 6.512, respectively. Further, the independent sample t-test conducted showed that t-value of 0.683 is not statistically significant at sig value 0.495 (two-tailed, $p>.05$). Hence, the null hypothesis is accepted and it is concluded that there is no significant difference between pre-service and in-service student teachers with regard to their digital mean scores.

Digital Literacy and Type of Family

The obtained results from Table 4 showed the digital literacy scores of joint family and nuclear

Table 1: Digital literacy among student teachers based on gender

Gender	N	Mean	Std. Deviation	t-value	df	Sig. level
Male	65	31.52	6.399	2.009	198	0.046
Female	135	29.66	6.023			

Source: Compiled from questionnaire and extracted from SPSS output

Table 2: Digital literacy among student teachers based on management

Management	N	Mean	Std. Deviation	t-value	df	Sig. level
Government	44	30.66	5.570	0.477	198	0.634
Private	156	30.15	6.370			

Source: Compiled from questionnaire and extracted from SPSS output

Table 3: Digital literacy among student teachers based on type of teacher trainee

Type of teacher trainee	N	Mean	Std. Deviation	t-value	df	Sig. level
Pre-service	186	30.18	6.179	0.683	198	0.495
In-service	14	31.36	6.512			

Source: Compiled from questionnaire and extracted from SPSS output

Table 4: Digital literacy among student teachers based on type of family

Type of family	N	Mean	Std. Deviation	t-value	df	Sig. level
Joint family	29	29.79	5.918	0.443	198	0.658
Nuclear family	171	30.35	6.252			

Source: Compiled from questionnaire and extracted from SPSS output

family background student teachers mean scores were 29.79 and 30.35 correspondingly with a standard deviation of 5.918 and 6.252 respectively. Further, the independent sample t-test conducted showed that t-value of 0.443 is not statistically significant at sig value 0.658 (two-tailed, p>.05). Hence, the null hypothesis is accepted and it is concluded that there is no significant difference between joint family and nuclear family student teachers with regard to their digital mean scores.

DISCUSSION

The present study on digital literacy among student teachers based on gender revealed that there is a significant difference between male and female student teachers with regard to their digital literacy mean scores. The overall digital literacy mean scores for male student teachers were higher than female student teachers, where it can be concluded that male student teachers have higher digital literacy as compared to female student teachers. Similar findings were reported by Jayavel (2019), Çam and Kiyici (2017) which stated a significant difference in digital literary scores in terms of gender but contradicts with Kuriakose (2019), Hairida et al. (2023). The findings in the present study could be a result of differences in knowledge, attitude, behavior intention, societal values and beliefs etc. towards technology. A systematic literature review on the digital competence of pre-service teachers by Shokeen and Kaur (2022) has concluded that various factors such as lack of attitude, beliefs, etc. hinder their digital competence. In this regard, all responsible stakeholders must ensure to bring a change in mindset by orienting the student teachers through seminars and workshops on the importance of technology in education.

On student teachers digital literacy scores based on management findings concluded that there is no significant difference between government and private student teachers with regard to their digital mean scores. This study's conclusion was corroborated by past research, which found that the type of management do not influence the digital skills of student teachers (Metha 2021; Lavanya 2022; Basu and Lakhbiro 2023). It is assumed that the current findings resulted from the fact that all B.Ed. students teachers, whether enrolled in government or private training institutes follows identical curriculum to help student teachers gain familiarity with computers and recognise ICT as an effective tool for effective learning. Moreover, the Nagaland University provides a two-year B.Ed. course syllabus that clearly outlines the use of ICT in secondary teacher education programs through a course work entitled – 'EPC 3: Critical Understanding of ICT' during their 4th semester. However, the findings contradicts with (Sasikala 2017; Kumar 2018; Yadav 2021) which confirmed that private B.Ed. college student teachers are better in ICT knowledge than aided B.Ed. college student teachers.

Further, the investigation in the present study also concluded that there is no significant difference between pre-service and in-service student teachers with regard to their digital mean scores. Jenßen et al. (2023) concluded that pre-service and in-service teachers do not need to differ greatly in learning opportunities when it comes to using ICT in geometry lessons and it was supported with the

findings of the present study. It is assumed that the current findings resulted from the fact that all B.Ed. students teachers, whether pre-service or in-service trainee understands that integration of technology in teaching enhance pupil learning experience. The digital knowledge and skills of teachers is duly emphasized in education especially after the pandemic havoc. In this regard, Dervenis et al. (2022) , Cervera and Caena (2022) also asserted that specific competences like digital competence of teachers have recently become of significant importance worldwide due to the COVID-19 pandemic. This might have led student teachers to adapt to this new mode of teaching through their prior experiences which led to improvement in their digital skills and knowledge. However, the finding contradicts with (Kaur 2018) which revealed that there exists significant difference between Computer Phobia scores of prospective and in-service teachers and also the findings revealed that digital competency among in-service teachers was higher than that of pre-service teachers (Yang et al. 2022).

The investigation in the present study revealed that there is no significant difference between joint family and nuclear family student teachers with regard to their digital mean scores. The findings of the present study correspond to the findings of Balasubramaniam and Kumar (2019). Findings revealed that type of family had significant impact on the amount of internet use by the students (Desai and Jaydipsinh 2016) students having nuclear family use more internet than their counterparts. No significant difference was found between nuclear and joint family B.Ed. biological science students in their awareness of ICT and its dimensions (Venkatesh 2018). The obtained result in the study could be attributed to unrestricted freedom in usage of technology and capacity to easily accommodate and adapt technology in one's daily life may have caused insignificant difference in digital literacy among student teachers based on type of family.

CONCLUSION

In the present study findings revealed that overall digital literacy mean scores for male student teachers were higher than the female student teachers. On student teachers digital literacy scores based on different management it concluded that there is no significant difference between government and private student teachers. The study also

concluded that there is no significant difference among student teachers belonging to different types of teacher trainees. Further, no significant difference was found between joint family and nuclear family student teachers with regard to their digital mean scores. Thus, the present study highlighted the digital literacy based on various socio-demographic profiles to gain a better understanding of the characteristics of the population. Furthermore, the findings of the study will help teacher education institutions to increase awareness on the importance of digital literacy among student teachers by introducing new initiatives to incorporate digital elements in education. The digital literacy of future teachers is inevitable and will serve as the basis for delivering quality education in the classroom. The knowledge, ability, and skills to use digital resources in education can be promoted through capacity training programmes, availability of infrastructure, access to information and technology, and provide practical experience etc. to improve the existing practices in teacher training programmes.

RECOMMENDATIONS

With the use of a standardized instrument, the analysis of this study yielded conclusions that may assist responsible stakeholders involved in comprehending the importance of digital literacy among student teachers. Furthermore, a revalidation of the results pertaining to variations in student teachers digital literacy based on their gender, management, type of teacher trainee, and type of family is important. It is recommended that positive attitude towards technology should be cultivated among female student teachers to enhance their digital skills in classrooms. In this sense, it is imperative that teacher education institutions along with responsible stakeholders must work together to guarantee that student teachers receive orientation on the use of technology in education through capacity building programmes. Since the teachers' curriculum is considered a key tool for achieving the National Curriculum Framework's objectives, effort should be made by teacher education institutions to provide generalized information on the subject of ICT in B.Ed. programmes through quality enriched curriculum by incorporating all the essential topics on digital literacy. This will enable student teachers to gain better

access to resources and information for continuing professional development, better teaching, learning, evaluation, and tracking, and higher levels of productivity. Besides, hands on training with better ICT lab and infrastructure, and access to technology is required to improve the digital competence of student teachers. Further, student teachers should be equipped with requisite knowledge and skills through capacity training programmes to critically evaluate online information through ethical usage of technology to prevent potential online risks.

LIMITATIONS

The present study was delimited to B.Ed. colleges and student teachers in Nagaland affiliated to Nagaland University. It was also confined only to 200 B.Ed. second semester student teachers who were undergoing teacher training in B.Ed. colleges of Nagaland. Hence, further studies can be undertaken on digital literacy among school students, higher education etc. with a larger sample size to compare with the findings of the present study. The present study considered gender, management, type of teacher trainee, and type of family as demographic profiles to study digital literacy. Other demographic variables can be considered when studying the factors affecting digital literacy.

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