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Bridging the Digital Divide: A Study on Digital Technology Access among Secondary School Teachers

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Abstract: The digital divide indicates the gap between people who have strong access to information and communication technologies (ICT) and people who have no or limited access to the technologies. The numerous forms of this digital divide can exacerbate social inequalities by hindering or enhancing social and economic capital of people, thus affecting their competence to participate in the society. Within the paradigm of the twenty-first century, the digital divide has been considered a critical concern when it comes to social justice; some researchers have even termed it as one of the causes of poverty, thus introducing the term of digital poverty. The current study falls into the category of a descriptive study as it involves the current situation with regard to the use of digital technology by secondary school teachers. The sample participants in this research are secondary school teachers who have been in teacher education programs. The convenience sampling method was used to conduct the sampling. The sample for this study consists of 80 teachers. The current study used the Faculty's Information and Communication Technology Access (FICTA) Scale to measure the teachers' access to information and communication technology. The reliability of the scale was confirmed by cronbach alpha, which showed that it had good reliability (α = .870). The results revealed that male teachers had slightly higher scores compared to female teachers, although it was very minimal. The study revealed that urban teachers had considerably higher access to digital technology compared to teachers in rural areas. Private school teachers had significantly higher access compared to teachers in government schools. Moreover, it was found that there were differences in teachers' access to digital technology based on age, where younger teachers had higher scores compared to older teachers.

Keywords: *Digital Divide, Digital Technology, Secondary School Teachers, ICT, Educational Technology, School Access.*

Introduction:

Nowadays we live in digital age beholding multidimensional revolutions in the structures and processes of societies and all arenas of human life due to the advent of emerging digital technologies (Khalil, Ishaq & Boedihartono, 2023). Information and Communication Technology (ICT) has significant potentials of improving the quality life of people. It has become so assimilated into modern society that the digital divide does not permit individuals with less or no access to ICT to engage in civic life in any meaningful way (Soomro et al., 2020). New digital technologies promise new levels of innovation and development opportunities (Cruz −Jesus et al., 2016). The previous technologies have created an incentive to enhance the involvement of individuals in social, political and economic spheres in recent years (Nishijima et al., 2017). ICTs can be significant in developing every nation (Yousef, 2013). As the main decision-makers in their classrooms, educators are faced with the

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increasingly growing need to not only be able to access digital technologies but also use them efficiently in order to enhance the learning experience (Xiaozhe & Xin, 2022; Xu & Stefaniak, 2024). However, despite the technological availability, the effectiveness of ICT integration in the pedagogical processes is still ambiguous (Momdjian et al., 2024; Tondeur et al., 2017). The introduction of digital technologies into the educational process remains a major challenge to the institutions of teacher-training in the country since the beginning of the implementation of digital technologies in India (Burns, 2012; Chaaban and Moloney, 2016). The digital competencies that future educators have to acquire deserve proper attention in preservice teacher-education programs (Tondeur et al., 2021).Digital divide is the term used to define the difference between people who have access to ICT and people who have 'zero' or low access to ICT. Various forms of digital gaps can lead to the widening of social differences by restricting or enhancing people's social and economic capital and their ability to participate in society. The digital divide has been regarded as a major issue in the twenty-first century and has been used by some researchers to define poverty as "digital poverty" (Lythreatis et al., 2022).

According to Rogers (2016), this is one of the issues that are considered as threatening the social justice of the twenty-first century. Despite the current high-speed technological development, the digital divide is one of the constantly existing challenges (Centeio, 2017). There is a need to close the digital divide that still exists among various players in education sector say between teachers and students. The positive impacts of the technological development in the education are now largely recognized. In turn, researchers recommend that teachers should use technology in their practice as often as possible (Centeio, 2017).

In schools and colleges, technological implementation is viewed as beneficial both in the facilitation of access and quality of the learning experience (Domingo and Gargante 2016). ICT provision to teachers is thus of the utmost importance. Digital exclusion limits the possibilities of teachers to use the benefits of technology in their teaching practice. In this regard, there is a need to explore the digital gap among educators in different learning institutions. These studies will enable creation of measures to reduce this problem, at least partially, to the teachers. This effort would also help in achieving the SDGs (United Nations, 2015), which seek to address the inequality in access to and participation in education on an international level.

ICT in learning: Teachers may positively apply technology in their pedagogue and thus solidify their competencies, enhance curriculum, and revolutionize learning through trial and error, adoption, and design of new teaching and learning strategies (Ertmer et al., 2012). The second prominent feature of new technologies is that they also support collaborative learning and make the instruction process more active and interesting to the students. It is believed by the practitioners that the read/write functionality of these technologies allows learners to exchange ideas and information and to practice collaboratively writing (Goh & Kale, 2016).

Digital divide and its effects to society: Persons of different socioeconomic statuses, provided that they adopt the new technologies, can play a significant role in making the society better. This means that all individuals in the society should be equipped with various ICTs and the necessary expertise to use them. However, the lack of equality in access to ICT cannot afford many people to use technology to boost several sectors of the society. This lack of access becomes the multifaceted phenomenon of the so-called digital divide, one of the complex problems (Chang et al., 2016). The social status and wealth of individuals can be increased with the help of the adequate

access to ICT; the lack of access increases the susceptibility of already vulnerable population groups (Rogers, 2016).

The significance of digital equity in education: The processes of providing classrooms with resources and the enhancement of technological ability of educators are fraught with issues of acceptability, sustainability, and scalability (Resta & Laferriere, 2015). The key challenge among them is to deal with the digital equity of students, teachers, and administrators. In order to empower the educational process with the help of ICT, the policies and initiatives that guarantee the equal access to digital technologies by both students and educators must be created (Resta & Laferriere, 2015).

Types of Digital Difference:

School Access: Access to school means not all schools have the same level of digital technology access. While the disparity between the number of computers and Internet access between high and low socioeconomic status (SES) schools has narrowed, it still exists (Parsad et al., 2005). There are also schools that are using technology in certain ways to conduct educational programs for children who are already doing well, and therefore at-risk children lack access to computers (Schofield & Davidson, 2004).

Home Access: Home access refers to whether or not students can use computers and the internet at home. Generally, teachers at high SES schools are pretty sure that almost all of their students have a computer and the internet at home (Warschauer et al., 2004). However, in low SES schools, teachers realize that many of their students may not have these things at home or they may have to contend with difficult situations at home, such as a slow internet connection or a computer shared by many people that is very old.

Generation Gap: This gap deals with the inequalities not among students, but between students and teachers. Many youth these days have spent a lot of their time using computers, video games, cell phones, digital cameras, digital music players, and the Internet (Lenhart et al., 2008).

Review of related literature:

The reviewed studies collectively highlight clear disparities in teachers' digital competence and access to technology. **Kormas et al. (2021)** found that rural teachers face major barriers such as limited budgets and poor internet access, often learning new technologies through trial and error. **Powers et al. (2020)** showed that rural teachers' perceived ease and usefulness of 1:1 technology predicted its effective classroom use. Reported significant differences between pre-service and in-service teachers (Aysha Khalil, Nasim Ishaq & Andayani Boedihartono, 2023; Momdjian et al., 2024), with pre-service teachers showing stronger digital skills. **Brown et al. (2025)** noted self-taught skill development and moderate confidence in technology integration, while **Wang (2013)** found large rural–urban gaps in technology availability. Overall, these studies reveal ongoing digital inequality and the need for greater digital training and infrastructure support for teachers.

Purpose Statement:

The aim of the present study is to investigate the access to digital technologies among secondary school teachers. Moreover, the study also aims to explore the gap between the two groups, providing further insight into the needs

that schools may have in the context of digital learning and the extent to which future teachers are being prepared to meet these needs.

Objectives:

1. To assess the extent of physical access to different types of digital technologies among secondary school teachers.
2. To study the access to digital technologies among secondary school teachers with respect to gender, school locality, type of school, and age.

Hypotheses:

The present study was based on the following hypotheses:

Ho1: There is no significant difference in mean scores of access to digital technologies between male and female secondary school teachers.

Ho2: There is no significant difference in mean scores of access to digital technologies between rural and urban secondary school teachers.

Ho3: There is no significant difference in mean scores of access to digital technologies between government and private secondary school teachers.

Ho4: There is no significant difference in mean scores of access to digital technologies between different ages of secondary school teachers.

Methods:

This section outlines the study design, the study participants and the data collection instruments.

Study Design: The research design is the plan, structure as well as the strategy of the research, which is designed to provide the answers to the research question and also control variance. The current research is a descriptive survey study since it focuses on the currently existing situation with regard to access of digital technology by secondary school teachers.

Participants: The population of the given study will include secondary school teachers currently studying in teacher education programmes. Sample was chosen through a method of convenience sampling and it will include 80 teachers.

Gender	School Locality	Types of School	Age
Male-(38)	Rural-(35)	Government-(30)	Below 25 years-(31)
			25-35 years-(33)
Female-(42)	Urban-(45)	Private-(50)	36-45 years-(8)
			Above 45 years-(8)

Figure 1. Distribution of teachers by Gender, Locality, Types of school and Age of the teachers

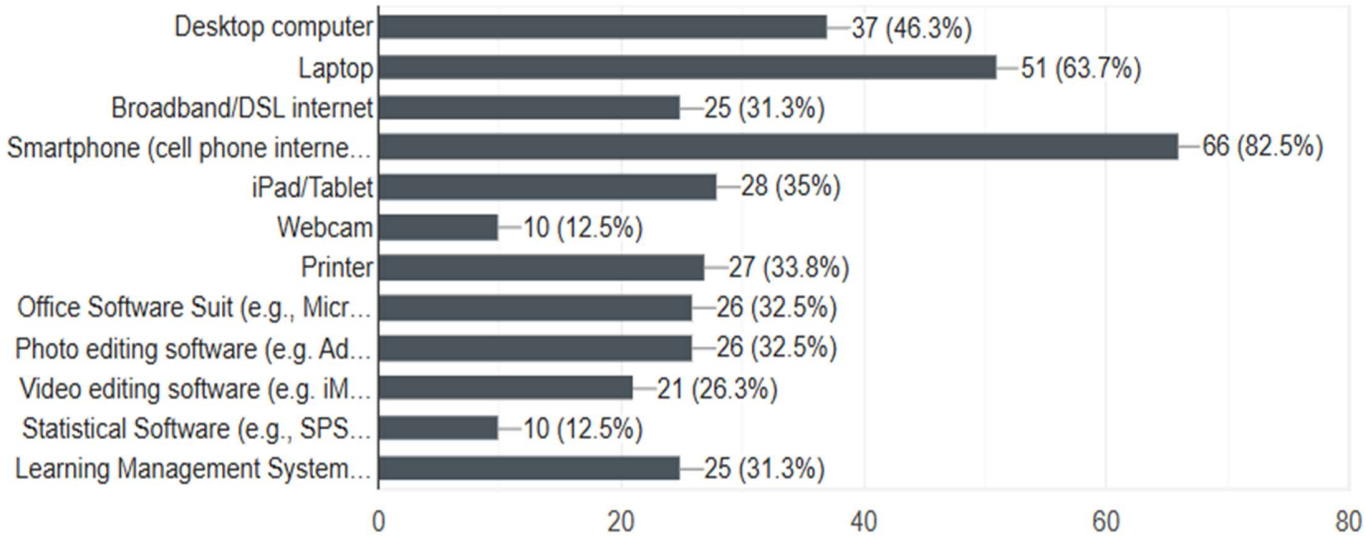
Instruments: The paper used the Faculty Information and Communication Technology Access, which is an ICT access scale, to evaluate ICT access of the participants (Soomro et al., 2018). The model that formed the basis of

the FICTA scale is the access to digital technologies (Soomro et al., 2020). The value of the Cronbach alpha showed that the scale had a satisfactory reliability (0.870).

Result: The hypothesis was to study the access to digital technologies of secondary school teachers in terms of gender, locality of the school, types of school and age of the teacher. The data were analysed with the help of a *t-test* (Independent sample t-test) and a *one-way ANOVA*, results are given below in table.

Objectives 1: To assess the extent of physical access to different types of digital technologies among secondary school teachers.

Fig1. Percentage of participants having physical access to various technologies



The data revealed that the percentage of secondary school teachers with access to smartphones was highest, consistent with global evidence that mobile devices are the most prevalent digital tools (Pew Research Center, 2021; UNESCO, 2022). The data further indicated moderate access to laptops, showing improvement compared to earlier findings in India (NCERT, 2020), particularly after the COVID-19 pandemic. However, the data also revealed limited access to internet connectivity and advanced digital tools, aligning with reports by the International Telecommunication Union (2021) and World Bank (2020), which highlight persistent infrastructural gaps. Overall, the data reflect a pattern of high access to basic devices but restricted availability of specialized technologies, indicating a second-level Digital Divide (van Dijk, 2020).

Objectives 2: To study the access to digital technologies among secondary school teachers with respect to gender, school locality, type of school, and age.

Table 1: A comparison of secondary school teachers' access to digital technologies in terms of gender

Gender	Mean	S.D	*df*	N	t-value	Sig.
Male	173.97	47.734	**78**	38		At 0.05
Female	171.50	33.425		42	**.271**	Level

The data revealed that there is no statistically significant difference in access to digital technologies between male and female secondary school teachers, which is consistent with findings of UNESCO (2022) and Pew Research Center (2021), indicating that gender gaps in basic digital access are gradually narrowing. However, this finding contrasts with studies by International Telecommunication Union (2021) and Hargittai, Eszter (2010), which highlight that gender-based differences may still exist in terms of digital skills and effective usage, particularly in contexts like India. Thus, while access appears nearly equal, disparities may persist at the level of usage and competence, reflecting the second-level Digital Divide.

Table 2: A comparison of secondary school teachers' access to digital technologies in terms of school locality

School Locality	Mean	S.D	*df*	N	t-value	Sig.
Rural	146.68	49.019	**78**	35	3.403	At 0.05
Urban	180.77	34.193		45		Level

The data revealed that there is a statistically significant difference in access to digital technologies between rural and urban secondary school teachers, with urban teachers having higher access. This finding is supported by van Deursen, Alexander J. A. M. and van Dijk, Jan A. G. M. (2019), who found that location-based disparities significantly influence access to digital resources and internet usage. Similarly, Wei, Lu et al. (2011) reported that individuals in urban areas benefit from better infrastructure and technological availability compared to rural populations. In contrast, some studies such as Robinson, Laura et al. (2015) suggest that while access gaps are narrowing, differences persist in quality and effective use. Overall, the result clearly reflects a locality-based Digital Divide, where rural teachers remain disadvantaged in terms of access to digital technologies.

Table 3: A comparison of secondary school teachers' access to digital technologies in terms of school types

School Types	Mean	S.D	*df*	N	t-value	Sig.
Government	168.32	42.509	**78**	30	**2.89**	At 0.05
Private	187.67	29.490		50		Level

The data revealed that there is a statistically significant difference in access to digital technologies between government and private secondary school teachers, with private school teachers demonstrating higher access. This finding is supported by Gil-Flores, Javier et al. (2017), who reported that institutional type significantly influences access to ICT resources, with privately managed schools often having better infrastructure and technological support. Similarly, Tondeur, Jo et al. (2010) found that school-level conditions, including funding and administrative support, play a crucial role in determining teachers' access to and use of digital technologies. In contrast, Ertmer, Peggy A. (2005) suggests that although access differences exist, pedagogical beliefs and training can sometimes outweigh infrastructural advantages. Overall, the findings highlight an institutional-level Digital Divide, where private school teachers benefit from better digital resources compared to their government school counterparts.

Table 4: Summary of one Way ANOVA of access to digital technologies in terms of age

Source of variance	Df	SS	*MSS*	F-value	Sig.
Age	3	62276.080	20758.693	23.215	0.05**
Error	76	67957.469	894.177		
Total	79	130233.550			

The data revealed that there is a statistically significant difference in access to digital technologies across different age groups of secondary school teachers, with younger teachers demonstrating higher access. This finding is supported by Hargittai, Eszter (2010), who found that younger individuals tend to have greater familiarity and access to digital technologies compared to older groups. Similarly, van Deursen, Alexander J. A. M. and van Dijk, Jan A. G. M. (2014) reported that age is a significant predictor of both access and digital skills, with younger users being more digitally engaged. However, Blank, Grant and Groselj, Darja (2014) suggest that while age differences exist, they are gradually narrowing as older individuals increasingly adopt digital technologies. Overall, the findings reflect an age-based dimension of the Digital Divide, where generational differences influence access and usage patterns in educational contexts.

Discussion:

The research sought to carry out a comparative study of the rural secondary school teachers versus urban teachers in accessing digital technology. The current results provide an insight into the main differences in the accessibility of digital technologies by teachers. Male teachers got slightly higher access scores compared to female teachers but the difference was small and not statistically significant, which means that there is relative equity in gender-based access. This was partially consistent with the findings of Orakova et al. (2024) who indicated that males had greater technological competence and females better pedagogical skills.Considerable variations were found in terms of school locality and type. The access of the urban teachers was significantly greater than that of the rural teachers, which is indicative of the barriers with regards to limited budgets, poor internet infrastructure, and insufficient infrastructure in rural regions (Kormos et al., 2021; Wang, 2013). Similarly, teachers in private-schools had a greater access than those in government-schools, which is in line with the results of unequal allocation of resources in schools (Lenhart et al., 2001; Hakkarainen et al., 2001). Access was also affected by age, as younger teachers scored higher than older teachers, indicating that the digital familiarity decreases with age (Momdijan, 2025; Khalil et al., 2020). On the whole, these results prove that there are still digital disparities based on locality, school type, and age that require specific professional training, infrastructure enhancement, and policies to make sure that the use of digital technologies in secondary education is equally available to everyone.

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