Digital Literacy of Women Teachers in Secondary Education in West Bengal: A Descriptive Study

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Abstract

In the digital era, digital technologies avail multifarious platforms and resources to benefit women teachers in educational processes. For effective teaching, digital literacy of women teachers plays a crucial role in learning outcomes. This descriptive study aimed to explore the digital literacy levels of women teachers based on their demographic variables. A sample of 330 women teachers were selected by multi-stage sampling technique from Govt. Aided School and Madrasah under West Bengal Board of Secondary Education (WBBSE) and West Bengal Board of Madrasah Education (WBBME). Data were collected using a self-standardized tool, 'Digital Literacy Tool for Secondary Education Teachers' (DLTSET), having content validity and high reliability coefficient (Cronbach's Alpha = 0.94). By descriptive analysis, only 28.79% of women teachers were found above moderate level of digital literacy, while 71.21% of women teachers not above average level, which further reflected a digital divide among women teachers. The TGT and PGT women teachers belonging to UR, OBC, SC, and ST were found to have the digital literacy to the same extent (54-55% approx.). Thus, the digital divide among women teachers reflected in findings is noticeable for educational policymakers and administrators to incorporate digital literacy contents into teacher education curricula and develop strategies and frameworks for digital literacy, competency and skill development program for women teachers in school and Madrasah under WBBSE and WBBME boards.

Keywords: Digital Divide, Digital Literacy, Educational Technology, Secondary Education, Women Teachers

Introduction

Digital technology is a widely implied means for creation and communication of information to benefit not only in higher educational sectors but also primary and secondary education level. Tinmaz et al. (2022) by systematic literature reviews showed trends in digital literacy since 2013 as digital literacy, digital competencies, digital skills, and digital thinking. Digital literacy and skills have been essentially required for enhancing teaching skill for teachers in secondary education and educators in higher education. Tuamsuk and Subramaniam (2017) used a quantitative research approach, conducting a survey across 116 universities in Thailand, and considered digital literacy an essential attribute of graduate identity. It plays an increasingly central and crucial role in the teaching-learning process. Digital literacy extends beyond basic computer skills. In a small-scale study, Chan et al. (2017) explored motivation for learning digital literacy and identified three key areas: digital competence, digital usage, and digital transformation. It encompasses the ability to effectively use digital tools and resources to enhance educational outcomes. MacLure and Stewart (2018) studied on pharmacy staff in North East Scotland about digital literacy experiences, and revealed four components, technology, training, usability, and processes for digital literacy. George Reyes and Avello-Martinez (2021) reviewed 138 articles on digital literacy in education from the Scopus database, and reflected that digital literacy encompass information, computer, and media literacy. Technology has brought a significant change, as reflected by Farias-Gaytan et al. (2022) showing an impact of technological advancements on digital transformation in education.

Review of Literature

MacLure and Stewart (2016) investigated the digital literacy knowledge in Australia, Canada, and US, and revealed a general lack of digital literacy knowledge among pharmacy staff. Suwana and Lily (2017), through interviews with founders, found that digital media literacy in Indonesia remains low due to inadequate education and limited opportunities. McDougall et al. (2018) collaborated with multinational technology providers and referred the use of mobile networked technology useful for school. Porat et al. (2018) discovered that junior high school students significantly overestimated their digital skills, particularly in the area of social-emotional abilities. Saxena et al. (2018) evaluated the digital literacy and smart phone usage of 260 dental students in Central India and found 80% of students to believe that social media supports their professional studies. Putra et al. (2019) assessed Santri's technology and information literacy by interviews and observations, and found a digital divide in attitudes between Santri and Pesantren toward technology. Spires (2019) found digital literacies in the global communication landscape through policy considerations to expand intellectual frameworks for researchers. Kaeophanuek et al. (2019) developed Critical Inquiry and Digital Story Telling (CIDST) based learning model for enhancing undergraduate students' digital literacy. Castaneda et al. (2020) found in experiment that information load and digital literacy impact are both factors to significantly influence website effectiveness. Yefanov et al. (2020) conducted survey of 500 participants in ten Volga Federal District cities and revealed a digital divide between students and teachers. Hyman et al. (2020) evaluated a new intervention with a pre-post design and showed a significant increase in digital health literacy. McKinstry et al. (2020) assessed a digital literacy framework in an Australian occupational therapy program, but showed limited focus on advanced digital literacy development.

Salim et al. (2020) assessed digital literacy among FKIP Universitas Halu Oleo students, and found only 54.83% with 'good' access and 40.11% with 'good' competency. Reddy et al. (2020) studied the digital literacy's role in sustainable development, and introduced a flexible learning model and ICT impact on learning. Pangrazio et al. (2020) studied on digital literacy in English-speaking, Scandinavian, and showed common issues across regions with differing approaches. Mohalik (2020) assessed digital literacy levels among 170 secondary-level teacher trainees with descriptive survey method, and indicated only 20% used digital devices for creating educational materials. Sanchez-Cruzado et al. (2021) quantitatively assessed the digital skills of 4,883 Spanish teachers using the ACDC tool and reflected a low self-perception of their digital skills. Yumiarty et al. (2021) explored digital literacy-based learning through qualitative analysis with observation and interviews, and identified learning process as preparation and digital material selection. Nazarova and Nazarov (2021) conducted sociological studies from Russian research and reflected that digital literacy levels influence societal digital transformations. Joaquim et al. (2021) explored digital literacy in lifelong education in Brazil and showed an association between lifelong learning, digital inclusion, digital literacy, and empowerment. Hassan and Mirza (2021) highlighted the importance of ICT integration in student-centred learning environments in Rajouri district, India, for learning outcomes. Park et al. (2021) studied trends in digital literacy in education since 2000 in American and European countries using a scientometric method showing that digital literacy is a multidisciplinary field with various domains. Rinekso et al. (2021) referred the digital literacy as the soft skills for managing digital information, understanding, searching, evaluating, creating, and sharing. Bansal and Kumar (2021) studied digital literacy among 540 secondary school students using multistage sampling and found that most students exhibited good digital literacy levels, and significant differences based on gender. Marin and Castaneda (2022) reviewed frameworks for developing digital literacy in education, showed a critical role of educators in enhancing competencies. Diepeveen and Pinet (2022) through online consultations during Covid-19 pandemic found recognized misinformation's connection to cybersecurity and unequal access to digital resources. Gutierrez-Angel et al. (2022) found that university programs enhance both perceived and actual self-efficacy in digital skills. Talukdar and Mete (2022) surveyed with 103 respondents and found a significant strong relationship between internet usage purposes and digital literacy. Wang and Si (2023) examined 7,523 documents from 1990 to 2022 to analyze digital literacy using bibliometric methods with trend analysis, network analysis and factor analysis and put insights into the field development. Wong et al. (2023) explored digital literacy (DL) by UNESCO's Digital Literacy Global Framework and highlighted that DL skills vary by devices and contexts. Smith and Storrs (2023) surveyed 496 undergraduates and examined a significant gap in digital literacy education. Wohlfart and Wagner (2023) systematically reviewed 23 reviews (1,062 studies) on technology integration and digital literacy and showed a need of digital literacy concept among teachers for technology integration. MV and Sarvamangala (2023) assessed digital literacy's role of the Digital India initiative, and showed that Digital India improves public service access and digital skills. Sunny and Ramasamy (2024) evaluated digital literacy skills among Sacred Heart College students and showed moderate to low digital literacy.

Research Gap

Reviews of related literatures showed a research gap in West Bengal secondary education

that operates within a diverse socio-cultural framework, governed by bodies like Secondary Education Board, and Madrasah Education Board. Despite initiatives to improve digital infrastructure, the digital literacy levels of teachers, particularly women, remain underexplored, especially based on factors such as designation, social categories, and other demographic variables, remain a significant challenge. Therefore, study was required in digital literacy level to identify the digital divide among the female teachers in secondary education in West Bengal.

Objectives of the Study
1. To explore digital literacy levels of secondary education women teachers.
2. To study digital literacy of secondary education women teachers based on designation.
3. To study digital literacy of secondary education women teachers based on social category.

Hypotheses
H_01: There is no significant difference in the digital literacy of secondary education women teachers based on designation.
H_02: There is no significant difference in the digital literacy of secondary education women teachers based on social category.

Methodology of the Study

The study was based on descriptive survey design. Women teachers in secondary education of Aided schools and Madrasahs under the WBBSE and WBBME boards in West Bengal, India were taken as the population out of which some 330 women teachers were selected by multi-stage sampling technique. Data were collected by the self-constructed tool "Digital Literacy Tool for Secondary Education Teachers" (DLTSET) consisted of 70 items and based on Likert-5-point scaling technique with Cronbach's Alpha 0.94 as reliability coefficient. Five levels of digital literacy were determined based on the z-scores of raw scores, as given in Table 1.

Table 1: Norms for Interpretation of Level of Digital Literacy

Levels	Level of Digital Literacy	Range of z-Scores
1st	Very High	+1.26 and Above
2nd	High	+0.51 to 1.25
3rd	Average	-0.50 to 0.50
4th	Low	-0.51 to -1.25
5th	Very Low	-1.26 and Below

Data were analyzed using statistical packages IBM SPSS 22.0 and MS-Excel software. The data for test variable 'Digital Literacy' and two group variables, 'Designation' and 'Social Category', were found to be normally distributed as per Kolmogorov-Smirnova and Shapiro-Wilk tests, as shown in Table 2.

Based on normality test, descriptive statistics for the 1st objective, parametric tests like independent sample t-test for 2nd objective, and ANOVA test for 3rd objective were applied to test the null hypotheses, and findings were reported.

Table 2: Test of Normality for Data of Independent Variables (IVs) of Study

S.N.	Independent Variables	Group variables	N	Kolmogorov-Smirnov (p-value)	Shapiro-Wilk (p-value)	Result of Normality
1.	Designation	TGT	172	0.200*	0.254	Normal
		PGT	150	0.200*	0.168	Normal
2.	Social Category	General	186	0.071	0.554	Normal
		OBC	60	0.200*	0.675	Normal
		SC	39	0.200*	0.740	Normal
		ST	32	0.200*	0.090	Normal

Results

***Objective-1: To explore digital literacy levels of secondary education women teachers.***

Data for the first objective was analyzed with descriptive statistics, and the levels of digital literacy of secondary education women teachers in West Bengal were classified in five levels, on the basis of the z-score for raw scores, viz. i) Very High, ii) High, iii) Average (Moderate), iv) Low, and v) Very Low, as given in the Table 3.

Table 3: Digital Literacy levels of Women Teachers in Secondary Education

Variable	Level of DLS	Number of Teachers (N)	Percentage of Teachers	Remark	Results
Digital Literacy (DL)	Very High	33	10	28.79%	Digital Divide Exists*
	High	62	18.79		
	Average	138	41.82	71.21% Not above Average	
	Low	64	19.39		
	Very Low	33	10		
	Total	**330**	**100**	100%	

*z-score

From Table 3, it was observed that only 28.79% of women teachers were found to have digital literacy level above average and 71.21% women teachers not above average in West Bengal.
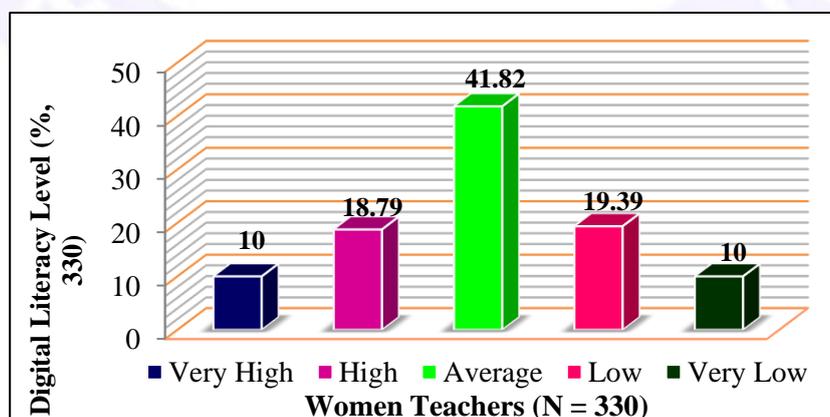
Graph 1: Digital Literacy Level of Women Teachers.

Since more than 50% of women teachers in secondary education (N = 330) were found not above average, therefore, it can be said that there exists a digital divide among the women teachers in West Bengal, as shown in Graph 1.

Objective-2: To study digital literacy of secondary education women teachers based on designation
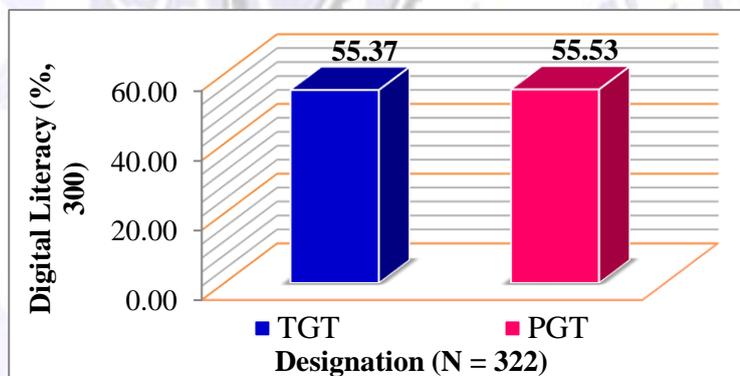
The first null hypothesis, H_01, "There is no significant difference in the digital literacy of secondary education women teachers based on designation" was tested, and results were obtained as given in Table 4.

Table 4: Designation wise mean difference in Digital Literacy of Women Teachers

Designation	N	Mean	SD	df	t-value	p-value	Remarks
TGT	172	193.78	25.48	320	-2.207	.836	Not Significant*
PGT	150	194.37	25.21				

*Significant at 0.05 level

From Table 4, the computed t-value was observed -2.207 which was not significant (p = 0.836 > 0.05, df = 320). Therefore, the null hypothesis, H_01 was not rejected. Thus, result reflects that TGT and PGT women teachers in secondary education in West Bengal were found to have the same level of digital literacy, as visualized in Graph 2.

Graph 2: Digital Literacy based on Designation of Women Teachers.

Objective-3: To study digital literacy of secondary education women teachers based on social category

The second null hypothesis H_02 "There is no significant difference in the digital literacy of secondary education women teachers based on social category" was tested, and results were obtained as given in Table 5.

From Table 5, the computed F-value was observed 0.598 which was not significant (p = 0.617 > 0.05). Therefore, the null hypothesis, H_02 was not rejected. Thus, result reflected that category women teachers belonging to Unreserved (UR), OBC (Other Backward Class), SC (Schedule Caste), and ST (Schedule Tribe) categories in secondary education in West Bengal state were found to have the same level of digital literacy.

Table 5: Social Category wise mean difference in Digital Literacy of Women Teachers

Source of Variation	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	1071.03	3	357.01	.598	.617
Within Groups	186972.09	313	597.36		
Total	188043.12	316	Not Significant*		

*Significant at 0.05 level

Discussions

Digital literacy has been defined by various researchers, encompassing items like the use of computers, mobile devices, and the internet, as well as different online tools for accessing, collecting, creating, transforming, evaluating, and sharing information. The present study found no significant difference in digital literacy of women teachers based on designation and social categories. Though women designated as Trained Graduate Teachers and Post-Graduate Trained Teachers does not differ in digital literacy level but have moderate level only whose digital literacy is around 55%, which showed their level not above average. Similar is the second findings wherein women of different social categories under UR, OBC, SC and ST do not differ in digital literacy level but have moderate level only whose digital literacy is around 55%. At the same time, a large number of women teachers in secondary education in West Bengal (71.21%, N = 330) were found to have digital literacy levels below average, which clearly indicates that a digital divide exists among women teachers in secondary education of Aided schools and Madrasahs under both the boards, WBBSE and WBBME.

Educational Implication

The study revealed 71.21% (N = 330) of women teachers having digital literacy levels not above average, which indicates a digital divide among women teachers in secondary education in West Bangal. Further, it draws attention of administrators and ICT policymakers to incorporate the items and components of digital literacy into the curriculum of school education and Madrasah education to bridge the digital divide among women teachers.

Though the digital literacy levels based on designation (TGT and PGT) and social category (ST, SC, OBC, and UR) were found similar, but it was not above moderate level (55% approx.), therefore, implication of the items of the tool of the study can benefit in preparation of digital literacy framework to enable women teachers to enhance their digital competency and skills.

Conclusion

The descriptive study based on offline survey of 330 secondary education women teachers of schools and Madrasahs under the WBBSE and the WBBME boards in West Bengal, using self-standardized tool revealed first that a digital divide exists among women teachers, showing 71.21% of women teachers having digital literacy not above moderate level. The second finding showed no significant difference in digital literacy between TGT and PGT women teachers in secondary education. Similarly, the third finding showed the women teachers belonging to ST, SC, OBC, and UR categories to have the same level of digital literacy, approximately 55%, which is also not

above moderate level. Thus, the study indicates that there should be a preparation of strategy and digital literacy development programmes for bridging the gap of digital divide among the women teachers of secondary education in schools and Madrasah in West Bengal state.

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