

Digital Competence of Secondary School Teachers: A Study

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ABSTRACT

The teaching learning process has undergone significantly transformation in current digital era due to introduction of digital technology. As a result, the role of teacher's has turned from serving typical knowledge transmitters to learning facilitators. In this sense teacher's digital competence has become needed for getting effective outcome in contemporary digital infused environment. The study seeks to assess the level of digital competence among secondary school teachers with reference to type of school (government and private), sex (male and female), and level of teaching (secondary and higher secondary teachers). A random sampling method used to select 75 high school teachers from Paschim Medinipur district of West Bengal. The data were taken by applying Digital Competence Scale which is developed by Ramkrishna (2017). In order to analyse and understand the data, statistical technique like percentage analysis and independent t-test was applied. The result of study indicated that majority of teachers (60%) have a moderate level of digital competence, indicating they can use digital tools in the classroom instruction satisfactorily but not competently while 29 % is high and only 11% with low level of digital competence. With further analyse revealed insignificant difference with respect to sex, type of school, and level of teaching. Therefore, study draw to conclude that digital competence is spread equitably among teachers regardless their demographic variable.

Keywords: *Digital Competence, Teacher Effectiveness, Techno-Pedagogical Skills, Digital Literacy*

Across the world, there is an improving demand for competent teachers who can prepare students to lead successful lives in a technology-driven and knowledge-based society. Technology has given teachers with wide opportunities to meet the contemporary demands of the education system across the world. Today's one of the most widely acceptable ways of learning through digital technology (Shipra2020). Teacher's digital competence has become crucial because it is fundamental agent in applying new curricula and educational modification (Hamad et al., 2023).

At present day, students learn facts, skills, knowledge, and value from computers, the internet, and social media platform. Technology has created a remarkable change in different aspect related to education. Digitalization of education comprise applied digital tools and technologies for educational administration, the teaching and learning process, evaluation,

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Received: April 30, 2026; Revision Received: May 06 2026; Accepted: May 09, 2026

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research, and extension activities (Jamir & Babu, 2023). Every teacher must ensure technological integration, pedagogy, and subject area content effectively in their classroom teaching (Dangwal & Srivastava, 2016). The University Grants Commission (UGC) is also motivating the development of e-content for all subjects domain. Teachers can also strengthen their ICT based instruction by using online learning courses like Modular Object-Oriented Dynamic Learning Environment (MOODLE) and Massive Open Online Courses (MOOCs) such as SWAYAM, Coursera, edix, Udacity, Future Learn, NovoEd, Canvas, etc. These courses support teachers to design successful and technology-supported lessons (Jamir & Babu, 2023).

Digital competence: Digital competence indicates to the knowledge, skills, and confidence to use digital technologies successfully in various areas of life like daily work, education, and different general activities. It embraces the ability to think creatively while utilising the digital tools, evaluate and apply the digital information, and actively participated in contemporary digital era. In the ground of education, digital competence among teachers includes a range of technical skills, digital literacy, and the capability to integrate technology into pedagogical purposes.

Dimension of Digital Competence: Ramkrishna (2017) determined five major dimensions for assessing the digital competence of teachers, namely knowledge of digital competence, expertise in using digital technology for teaching learning, evaluating and authorizing online information, managing and communicating digital data, collaborating and sharing digital data for teaching learning. These dimensions focus the knowledge and skills teachers need to utilised technology in teaching learning practices.

Knowledge of Digital Practices: Knowledge of Digital Practices indicate to a teacher's fundamental understanding and ability to dealing digital tool and devices. It includes various task like create and organizing file, transferring files between drives, play CD/DVD, protecting digital data, take a printout through printer. Furthermore, it involves create and publish content in multimedia sets up for subject-related instruction, and run LCD projector in the classroom, searching the essential tool to search on the internet, use or create required information from the internet, use scanner to scan images, implement web camera for online communication and also capture images.

Expertise in Using Digital Technology for Teaching Learning: This dimension refers practical use of digital tool and devices to enhance the quality of teaching learning. It emphasises initializing presentation through power-point, capable to use word processing and editing, sending e-mails and run educational video, able to interaction and create e-content for different levels of students, downloaded subject related content and materials, use animation in their presentation, work with MS excel, and utilise different type search engine like Google, Yahoo, Search ask, Web-crawler, my web search, and so on.

Evaluating and Authorizing Online Information: Evaluating and Authorizing Online Information indicates capability to judge the quality and authenticity of online contents. Teachers have to contact the subject expert for any doubts through online, compare relevance about the information from and within multiple websites, and identify reliable and unreliable sources. Consequently, use mobile phone for learning, confirm authentic websites while referencing, and following ethical practices to use the information while utilising online information.

Managing and Communication Digital data: Managing and Communicating Digital Data refers to teacher's proficiency to saving and organizing documents in various file formats, visit educational websites regular for updated the knowledge, searching for text, images, and results from websites, use virtual laboratory and e-books, and enrol online courses through platform like MOOC and Swayam and so on.

Collaborating and Sharing Digital Data for Teaching: Learning Collaborating and Sharing Digital Data for Teaching Learning refers to communicate with students concerning homework and assignments through mobile and the internet. It also includes share information using formal networking platforms, organize and share information online and on so sites, consult experts on the internet using instant messaging tools such as WhatsApp, Facebook, yahoo, MSN, skype etc., use online sites for ordering relevant educational materials like books, models, charts, etc.

NEP and digital competencies:

The NEP 2020 strongly focuses the successful integration of technology into the teaching learning process to enhance the learner's with 21st century skill and competencies. Accordingly, the Samagra Shiksha Scheme, a centrally sponsored flagship program in India aimed at improving the quality of education, provides for integrating information communication and technology (ICT) in classrooms (Rawal,2024). Furthermore, the National Education Policy (NEP) 2020 in India focuses the importance of enhancing teacher's digital skill. Therefore, that they may effectively utilise technology to improve student learning (Tiwari & Magre, 2025).

Significance of the Study:

The teaching learning process has undergone significantly transformation in current digital era due to introduction of digital technology. As a result, the role of teacher's has turned from serving typical knowledge transmitters to learning facilitators. In this sense teacher's digital competence has become needed for getting effective outcome in contemporary digital infused environment. Teachers who have possessing high levels of digital competence can utilise technology to create interactive, dynamic and personalized learning experiences, engage students sufficiently as well meaningful way. They can also motivate and facilitate collaboration and communication. Furthermore, Techno-pedagogical skills enable teachers to establish interactive, dynamic and personalized learning environment to dealing with diverse student needs, and promote critical thinking and digital citizenship skills (Sachanand Dwivedi,2023). As secondary education is a blooming stage in children developing, where they can more getting learning and can easily gain wide range of knowledge across the different filed of education. As we all know very well that traditional teaching method has gradually being replace by digital and blended learning approaches. Therefore, secondary school teachers have not only subject knowledge, they have to expertise in using digital tool in instructional practices. In order to prepare students for digital life to become digital citizens, it has become necessary for teachers to acquire and implement digital competence in the classroom (Momdjian et al., 2024). On the other hand, teacher who have no sufficient competence in digital use cannot remain themselves with modern teaching practices, resulting in reduce student interest and student engagement. Teacher's digital competence has become crucial because it is fundamental agent in applying new curricula and educational modification (Hamad et al., 2023).

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Objectives of the Study:

- To assess the level of digital competence among secondary school teachers of Paschim Medinipur.
- To compare the digital competence of secondary school teachers with reference to their sex, type of school, and level of teaching.

Hypothesis:

- There is no significant difference in the digital competence of male and female secondary school teachers.
- There is no significant difference in the digital competence of government and private primary school teachers.
- There is no significant difference of secondary and higher secondary teachers in the Digital Competence.

METHODOLOGY OF THE STUDY

The researcher employed a descriptive survey method to proceed the present study. The investigator personally visited the secondary school and administered a Digital Competence scale developed by the Ramkrishna (2019), which included a sample of class IX to XII teachers. The secondary teachers were informed about the purpose of the study, they were instructed to fill in the tool, and necessary clarification was given. For the present study, data collected regarding teachers' digital competence were gathered, in order to make a comparison between government versus private, male versus female teachers, and secondary and higher secondary teachers. Therefore, the survey method under the descriptive research approach was used in the present study.

Population

All the secondary school teachers of the Paschim Medinipur of West Bengal constituted the population of the study. It included the teachers teaching classes from IX to XII standard in government and private schools.

Sample & Sampling Technique

The investigators employed a random sampling technique for the present study. At first, the investigators selected one block and one municipality from the Paschim Medinipur of West Bengal through random sampling. At second stage, the investigators selected 8 secondary schools (4 private and 4 government) from selected block and municipality through random sampling. Finally, the researchers included teachers from a details list of teachers in each selected school by using a random sampling method, ensuring that every person in the population had an equal opportunity of being selected. This process not only enhance the sample more representative but also eradicates bias in selection, so it increases the reliability and validity of the result. 5 incomplete questionnaires were removed. Thus, a total sample of 75 primary school teachers was included for the present study.

Tool

In the present study Digital Competence scale developed by the Ramkrishna (2019) was used for data collection and assess the Digital Competence of secondary school teachers.

Statistical Technique:

The investigator used Mean, SD Percentage, and t-test for the analysis of the data.

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Delimitation

1. The study was confined to one variable only, i.e. Digital Competence.
2. The study was conducted on primary school teachers with reference to their sex, type of school, and level of teaching only.

RESULT AND FINDING

Table no 1. the level of digital competence of secondary school teachers

Sr. No	Level of Competence	Range of Raw Score	No of Teachers	Percentage
1	Low	183 and below	08	11%
2	Moderate	184-109	45	60%
3	High	110 and above	22	29%

Table 1 clearly defines that out of 75 secondary school teachers, majority of teachers 45 (60%) have a moderate level of digital competence, indicating they can use digital tools in the classroom instruction satisfactorily but not competently while 08 (11%) teachers with low level of digital competence showing lack of expertise and need for additional training and support. Only 22 (29%) teachers have high level of competence suggesting superior knowledge about integrating digital practices in classroom environment.

For testing the null hypothesis (H01) that, “There is no significant difference in the digital competence of male and female secondary school teachers”, an independent sample t-test was applied, as shown below in Table No. 2

Table no.2: group statistics

Sr. No	Sex	N	Mean	SD	df	T -value	P -value	Remarks
1	Male	39	197.49	16.836	73	-.860	.393	Not Significant
2	Female	36	194.78	8.932				P> 0.05

As shown in the above table, out of 75 secondary school teachers, 39 were male and 36 were female. The mean score of secondary school teachers for digital competence on the basis of sex were is 197.49 & 194.78 with SD 16.836 and 8.932 for male and female respectively. In addition, the calculated t-value is 860 with df 73 and p-value .393 ($p > 0.05$), which means that there is no significant difference in the digital competence of male and female secondary school teachers Hence, the null hypothesis no 2, there is no significant difference in the digital competence of government and private secondary school teachers.

For testing the null hypothesis (H02) that, “there is no significant difference in the digital competence of government and private secondary school teachers”, an independent sample t-test was applied, as shown below in Table No. 3.

Table no.3: group statistics

Sr. No	Type of Institute	N	Mean	SD	df	T -value	P -value	Remarks
1	Government	45	197.51	12.892	73	1.033	.305	Not Significant
2	Private	30	194.20	14.611				P> 0.05

As shown in the above table, out of 75 secondary school teachers, 45 were Government and 30 were Private. The mean score of secondary school teachers for digital competence on the basis of type of institute were is 197.51 & 194.20 with SD 12.892 and 14.611 for government and private respectively. Furthermore, the calculated t-value is 1.033 with df 72 and p-value.

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.305 ($p>0.05$), which means that there is no significant difference in the digital competence of government and private secondary school teachers. Hence, the null hypothesis no 2, there is no significant difference in the digital competence of government and private secondary school teachers.

For testing the null hypothesis (H03) that, “there is no significant difference of secondary and higher secondary teachers in the Digital Competence”, an independent sample t-test was applied, as shown below in Table No. 4.

Table no.4: group statistics

Sr. No	Level of Teaching	N	Mean	SD	df	T - value	P - value	Remarks
1	Higher Secondary Teachers	48	197.56	14.589	73	1.170	.246	Not Significant
2	Secondary Teachers	27	193.74	11.511				$P> 0.05$

As shown in the above table, out of 75 secondary school teachers, 48 were Higher Secondary Teachers and 27 were Secondary Teachers. In the similar fashion, the mean score of secondary school teachers for digital competence on the basis of Level of Teaching were is 197.56 & 193.74 with SD 14.589 and 11.511 for Higher Secondary and Secondary Teachers respectively. Furthermore, the calculated t-value is 1.170 with df 73 and p-value .246 ($p>0.05$), which means that there is no significant difference in the digital competence of Higher Secondary and Secondary Teachers. Hence, the null hypothesis no 2, there is no significant difference in the digital competence of Higher Secondary and Secondary Teachers.

DISCUSSION

The study aims to examine the level of digital competence among secondary school teachers in Paschim Medinipur and to compare their competence with reference to their sex, type of school, and Level of Teaching. Result analysis of the digital competence showed that the majority of the (60%) have a moderate level of digital competence, indicating they can use digital tools in the classroom instruction satisfactorily but not competently while 29 % is high and only 11% with low level of digital competence. The present study also correlated with the literature stating that there is general view among the prospective teachers that they do have a low level of competence in the areas of digital literacy skill (Gutiérrez Porlán & Serrano Sánchez, 2016a; Hinojo-Lucena et al., 2019). The reason for moderate level of digital competence might be unequal accessibility towards digital equipment, unavailability of resources, attitude towards embracing change and novelty.

Unlike the studies of Kaur (2019); Varghese & Arya, (2024); Kumar & Angadi (2023); Kumari et al (2023), the present study state that there is no significant difference in the level of digital competence among the male and female secondary school teachers. It is may be due to the equal educational and technological opportunity received by the students of Paschim Medinipur irrespective of their sex. This, unfortunately, goes contrary to Vishnu et all (2022), Dar Ponraj (2022), who found a significant difference between digital competence of male and female secondary school teachers, proposing that these differences may be contingent upon that male high school teacher has the scope to take part in different types of computer courses and other technology-related online programmes as compared to female high school teacher. The investigators also found that there was no significant difference between government and private school teachers on digital competence. Varghese & Arya (2024)

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Kumar & Angadi (2023) Kumari et al (2023) found similar results with respect to competence of government and private teachers. It may be the impact of technological advancements and the availability of resources and opportunities for professional development of in government and private school teachers. This, unfortunately, goes contrary to Ilyas (2020), Jamir & Babu (2023) who found a significant difference between digital competence of government and private secondary school teachers Furthermore, no significant difference between digital competence of government and private school teachers. Overall finding of the present study reveals that demographic variables, including sex, type of school, and level of teaching, do not substantially influence digital competence of secondary school teachers in Paschim Medinipur.

Educational Implications:

- **Need for Teacher Training:** Since most teachers were found to have moderate digital competence, regular professional development programmes should be organized to improve their techno-pedagogical skills.
- **Integration of ICT in Schools:** Schools should provide digital tools such as smart boards, projectors, internet access, and e-learning resources for effective teaching.
- **Policy Implementation:** Educational authorities should implement the recommendations of NEP 2020 regarding digital education and teacher competency development.
- **Equal Opportunities:** Since no significant differences were found based on sex, school type, and teaching level, equal training opportunities should be ensured for all teachers.
- **Student Learning Enhancement:** Digitally competent teachers can create interactive, personalized, and learner-centered classrooms, improving student achievement and motivation.
- **Promotion of Digital Citizenship:** Teachers should guide students in ethical and responsible use of technology.

Suggestions for Future Study

- Similar studies may be conducted on a larger sample covering different districts or states.
- Future research may include additional variables such as age, teaching experience, qualification, subject stream, and socio-economic background.
- Experimental studies may be conducted to examine the effect of digital training programmes on teacher competence.
- Studies may explore the relationship between digital competence and teacher effectiveness, job satisfaction, or student achievement.

CONCLUSION

The present study concludes that majority of teachers have a moderate level of digital competence, indicating they can use digital tools in the classroom instruction satisfactorily but there is still room for improvement in advanced and effective classroom integration. while teachers with low level of digital competence showing lack of expertise and need for additional training and support. A smaller proportion teachers have high level of competence, while some still had low competence and require additional support and training. With further analyse revealed insignificant difference with respect to sex, type of school, and level of teaching. Therefore, study draw to conclude that digital competence is spread equitably among teachers regardless their demographic variable. As secondary education is a blooming

stage in children developing, where they can more getting learning and can easily gain wide range of knowledge across the different filed of education. As we all know very well that traditional teaching method has gradually being replace by digital and blended learning approaches. Therefore, secondary school teachers have not only subject knowledge, they have to expertise in using digital tool in instructional practices.

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Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Vazalwar, C.S. & Moin, SK (2026). Digital Competence of Secondary School Teachers: A Study. *International Journal of Social Impact*, 11(2), 220-228. DIP: 18.02.020/20261102, DOI: 10.25215/2455/1102020