Digital Competence among School Teachers in Nagaland State: Differences with reference to Type of Management, Work Experience, and Subject Taught

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Abstract

The purpose of this study is to examine the Digital Competence among the school teachers in Nagaland State with reference to the type of management, work experience, and subject taught. A total of 400 teachers participated in the study. The sampling method of study is Multi-Stage Random Sampling Method. The Digital Competence Scale for Teachers (DCST) was used as a data collection tool in the study. The study revealed that private school teachers have higher digital competence. The study also revealed a significant difference among the school teachers about work experience, the school teachers having less than 2 years were found to have higher Digital Competence than those teachers having more years of work experience. With regard to the results of the subject taught, it is evident that there seems to be no significant difference among the school teachers teaching different subjects.

Keywords: Digital Competence, School Teachers, Management, Work Experience, Subject Taught

Introduction

With the progression of digital technology in education, there has been a paradigm shift in the education system throughout the world. It is proceeding from the traditional methods of teacher-centered learning to modern learner-centered teaching methods. Today, students learn facts, skills, knowledge, and attitudes from computers, the internet, and social media. Technology has created a significant difference in various processes related to education. Digitalization of education includes using digital tools and technologies for educational administration, the teaching and learning process, evaluation, research, and extension activities. Teaching and learning through digital technology is playing an increasingly vital role in assisting teachers meet many of the expectations of today's technological world by providing innovative teaching tools, access to information, global collaboration opportunities, and alternative ways to professional development that have consistently resulted in the enhancement of the educational development of many nations. Technology has heralded the development and implementation of new and innovative teaching strategies in higher education. Globally, there is an increasing demand for skilled teachers to prepare students to lead successful lives in a technology-infused, knowledge-based society. Technology offers teachers the keys to unlock a huge world of opportunities available to meet the demands of the education

system across the world. One of the most acceptable ways of learning being practised nowadays is learning through digital technology. Shipra (2020)

The University Grants Commission (UGC) is encouraging the development of e-contents for all subjects. Teachers can also use online 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 ., to develop their ICT based lessons. Software like M.S.Word , Excel spreadsheets, SPSS, Publisher, VLC media player, Youtube, Clip-grab, etc. can be used by the teachers for their techno-pedagogical needs. The Internet has a vast variety of e-resources such as E-mail, group mail, podcasting, e-portfolios, e-learning platforms, audiovisual resources and multimedia, Blogs and library websites like ERIC (Education Resources Information Center) books, online Databases, Gateways and portals, e-journals, e-reports, Websites and home pages like Central Institute of Educational Technology (CIET) is a unit of the National Council of Educational Research and Training (NCERT), yahoo, google, bing, Aol, altavista, excite, lycos, etc., can also be used by the teachers as ICT resources for their techno-pedagogic teaching. Teachers and students can use Open Educational Resources (OER) these are public domain resources or resources that can be used under an intellectual property license that allows re-use or adaptation - e.g., Creative Commons for their teaching/ learning process. OER can be used as educational resources by all, especially those in resource-poor environments to achieve quality education.

Digital Competence consists of various skills and competencies and its scope covers media and communication, technology and computing, literacy, and information science. Digital competence consists of technical skills and abilities to use digital technologies in a meaningful way for working, studying, and for daily life in various general activities, abilities to critically evaluate digital technologies, and motivation to participate in the digital era.

Literature Review

Anjali Shokeen et al.,(2022) found that attitude & self-efficacy, required skills & knowledge, practical experiences of using technology, and access to technology are the factors that majorly influence pre-service teachers' digital competence. Himangshu et al., (2022) found no significant difference between male and female teachers in access and use of ICT in the teaching-learning process. Nandhakumar & Govindarajan (2022) found that significant effects like digital pedagogy in the teaching-learning process led to the effective teaching competency of the B.Ed. students in physical science. Mohalik (2020) study intended to find out the level of digital literacy and its uses among teacher trainees at the secondary level. This study indicates that teacher training institutes are equipped with digital devices and the majority of trainees have a smartphone with a data plan. The study also indicates that trainees are using digital devices during the internship in the teaching programme for planning lessons, preparing teaching-learning materials, and presenting the lesson. Yazon et al., (2019) showed that there is a strong and significant relationship between faculty members' digital literacy and research productivity. Lagarto et al., (2018) found that there was a significant improvement in the number of teachers who have undergone information and communication technologies training Vázquez-Cano et al., (2017) found that males had greater perceived competence in digital cartography and

online presentations, whereas females preferred to request personal tutorials to resolve doubts about technology and had greater perceived competence in corporate emailing. Dangwal and Srivastava (2016) discussed the role of digital pedagogy in the Indian teacher education system. They concluded that every teacher must ensure technological integration, pedagogy, and subject area content effectively in their classroom teaching. Grünwald et al., (2016) found that university teachers had the optimal level of competence in media and equipment, media literacy, and teaching staff motivation but showed a low-level competence that requires specific professional knowledge in courses, didactics, and instructional design, Learning Management Systems and e-moderation. Kimmons (2015) conducted a study on Technology integration coursework and finding meaning in pre-service teachers' reflective practice and suggested that they need to have good command over accessing, creating, and effectively utilizing such digital resources to get their learners acquainted with a better understanding of its meaningful exploitation. Srivastava and Bisht (2015) revealed that the majority of the pre-service teachers have a positive attitude towards the use of ICT and they are competent in the use of a few basic ICT tools. The study also indicated no significant difference between male and female pre-service teachers' competence and attitudes toward ICT. Shabana Tabusum et al., (2014) findings of the study revealed that the students were digitally literate and the majority of them were average in computer literacy level. Kumbar and Pattanshetti (2013) examined the essential competencies of Indian school librarians in the digital age and found that competence and collaboration are the key factors that may determine the professional growth and contribution the school librarians and with proper

training, they may become the main link between digital resources and users. Magdaş and Bontea (2011) developed educational software for developing digital skills among students of XII grade of a technical profile. They found that the use of educational software and computer-assisted instruction in teaching and learning contributes to a significant increase of the efficiency of education.

Objectives of the study

1. To study the difference in digital competence scores among school teachers with respect to management.

2. To study the difference in digital competence scores among school teachers with respect to work experience.

3. To study the difference in digital competence scores among school teachers with respect to the subject taught.

Hypotheses of the Study

1. There is no significant difference between government and private school teachers towards digital competence scores.

2. There is no significant difference in digital competence among school teachers with reference to work experience.

3. There is no significant difference in Digital Competence scores among school teachers with reference to the subject taught.

Methodology

Research Design: A research design program guides the investigator in collecting, analyzing, and interpreting observations. It thus provides a systematic plan of procedure for the

researcher to follow. (Krishnaswami & Ranganatham, 2016)

Research Method: For the present study Descriptive method was used. Descriptive studies are primarily concerned with finding out "what is". To obtain quantitative data, the Digital Competence Scale for Teachers (DCST) developed by Ramkrishna (2017) and the personal data sheet prepared by the researchers to obtain the qualitative data, were applied to the school teachers.

Population and Sample: The population of the present study comprised all teachers working in high schools and higher secondary schools of bo1th government and private schools in Nagaland. The sample used in the present study is 400 school teachers which comprise 128 male and 272 female school teachers who were the sample subjects. For the present study, Multi-Stage Random Sampling Technique was adopted to select the school teachers of both government and private schools.

Data Collection Tools:

1) Personal Data Sheet: Personal Data Sheet prepared by the researchers consist of questions such as the name of the teacher, name of the school, management of the school, years of work experience, and subject taught. To gather information about the teachers who are the subjects in the study.

2) Digital Competence Scale for Teachers (DCST): The tool which was used by the investigator in the present study was Digital Competence Scale for Teachers (DCST) developed and standardized by Ramkrishna (2017) was adopted and used by the researchers to determine the difference in digital competence about gender, age and educational qualifications. The scale consisted of 50 items and the major factors included in this scale are: A. Knowledge of Digital Practices, B. Expertise in Using Digital technology for teaching learning, C. Evaluating and Authorizing Online information, D. Managing and Communicating Digital Data, E. Collaborating and Sharing Digital Data for Teaching Learning.

Application and Data Collection: The investigators personally met the school teachers and asked them to volunteer to participate in the study conducted. Each of them was given sufficient time to reflect on the question while answering them so that they could understand each and every question properly before they answer them. After collecting the data, tabulation of the information according to the objectives and subsequent evaluation of the data was done.

Data Analysis: In this context, in the analysis of the data; independent t-Test, ANOVA were used.

Data Analysis and Interpretation

Digital Competence and Management:

To find out the significant difference, the data has been analysed and interpreted using descriptive statistics such as mean, and standard deviation. The hypothesis is tested by employing the "t" test. The value of "t" was set at 1.96 for the significance level with df = 398. It is presented in the table below.

Table-1: Mean Score, SD and t- value of Digital Competence Scores between Government and Private School Teachers

Variable and its Dimensions	Management	N	Mean	S.D	t-Value
Knowledge of Digital Practices	Government	185	44.88	7.859	4.252*
	Private	215	48.25	7.920	
Expertise in Using Digital Technology for Teaching Learning	Government	185	45.57	6.537	7.262*
	Private	215	50.43	6.789	
Evaluating and Authorizing Online Information	Government	185	36.19	5.746	5.947*
	Private	215	39.79	6.250	
Managing and Communicating Digital Data	Government	185	29.92	4.650	5.305*
	Private	215	32.31	4.325	
Collaborating and Sharing Digital Data for Teaching Learning	Government	185	31.42	4.332	5.325*
	Private	215	34.15	5.722	
Digital Competence score	**Government**	**185**	**187.98**	**26.263**	**6.256***
	Private	**215**	**204.92**	**27.617**	

Note: Table value for 398 df at 0.05 level= 1.96
@ indicates not significant at 0.05 level and * indicates significant at 0.05 level

From Table-1 overall data shows the mean score of digital competence of government teachers is 187.98 and the mean score of private teachers is 204.92. This indicates the difference of mean score of 16.94 which is in favour of private school teachers and shows that private school teachers have higher digital competence than private school teachers.

Again a result from the above table shows the observed t-value is 6.256 is higher than the table value (1.96) with 398 df at 0.05 level of significance. It indicates that there is a significant difference in digital competence with respect to government and private school teachers. The stated null hypothesis, "there is no significant difference between government and private school teachers towards digital competence scores" is not accepted. Thus the result revealed that the private school teachers have higher digital competence than the school teachers working in government schools. The probable reason may be that in private schools the teachers performance is being monitored as a result private school teachers are updated with modern teaching methods which is lacking in government schools.

Digital Competence and Work Experience:

The Secondary School teachers were classified as having Work Experience, Less than 2 Years, 2 Years to 5 Years, 6 Years to 10 Years, 11 Years and above, and the results are given in table- 2.

Table-2: Summary of Analysis of Variance digital competence scores on school teachers Based on the Work Experience

Variable and its Dimensions	Sum of squares		Mean of squares	F Value
Knowledge of Digital Practices	Between Groups	270.927		4.310*
	Within Groups	62.865		
Expertise in Using Digital Technology for Teaching Learning	Between Groups	244.536		5.058*
	Within Groups	48.347		
Evaluating and Authorizing Online Information	Between Groups	38.193		0.969@
	Within Groups	39.405		
Managing and Communicating Digital Data	Between Groups	52.757		2.500*
	Within Groups	21.104		
Collaborating and Sharing Digital Data for Teaching Learning	Between Groups	27.058		0.963@
	Within Groups	28.090		
Digital Competence Score	**Between Groups**	**2119.843**		**2.700***
	Within Groups	**785.237**		

Note: Table value for (4,395) df at 0.05 level= 2.39
@ indicates not significant at 0.05 level and * indicates significant at 0.05 level

The above Table-2 shows that the calculated value of F is 2.700 which is greater than the table value of 2.39 at 0.05 level of significance with (4,395) df. Hence, we do not accept the null hypothesis, "There is no significant difference in digital competence among school teachers with reference to work experience.". We may, therefore, conclude that there is a significant difference in digital competence with years of work experience among school teachers in Nagaland. The observed result shows that the teachers having less than 2 years have more Digital Competence than teachers having more years of teaching experience. This may be because the newly added teacher was more proficient in using digital devices and was able to prepare the lesson and get more information about the content. Overall data shows the mean scores of digital competence with respect to categories of years of work experience, i.e., less than 2 Years and 2 years to 5 years is 205.43 and 202.12 respectively, 6 years to 10 years and 11 years and above mean scores is 195.95 and 192.15 each. Lastly, the mean scores of other categories are 200.33. This indicates that school teachers with less than 2 years of working experience have higher digital competence.

Digital Competence and Subject Taught:

Table-3: Summary of Analysis of Variance digital competence scores on school teachers Based on the subject taught

Variable and its Dimensions	Sum of squares		Mean of squares	F Value
Knowledge of Digital Practices	Between Groups		176.786	2.770*
	Within Groups		63.819	
Expertise in Using Digital Technology for Teaching Learning	Between Groups		17.157	0.339@
	Within Groups		50.649	
Evaluating and Authorizing Online Information	Between Groups		26.808	0.678@
	Within Groups		39.520	
Managing and Communicating Digital Data	Between Groups		36.370	1.710@
	Within Groups		21.270	
Collaborating and Sharing Digital Data for Teaching Learning	Between Groups		15.178	0.538@
	Within Groups		28.211	
Digital Competence Score	**Between Groups**		**669.246**	**0.837@**
	Within Groups		**799.926**	

Note: Table value for (4,395) df at 0.05 level= 2.39
@ indicates not significant at 0.05 level and * indicates significant at 0.05 level

The above Table-3 shows that the calculated value of F is .837 which is lower than the table value of 2.39 at 0.05 level of significance with (4,395) df. Hence, we accept the null hypothesis, "there is no significant difference in Digital Competence scores among school teachers with reference to the subject taught". We may, therefore, conclude that there is no significant difference in digital competence among school teachers about subjects taught in Dimapur District. The results also depicts that teachers teaching mathematics subject have slightly higher Digital Competence than teachers teaching other subject the probable reason may be that mathematics subject is mostly considered a dull and difficult subject to many students therefore the teacher may be using digital tools to arouse the interest of the students in this subject which have resulted in higher digital competence among the school teachers. overall data shows the mean scores of digital competence concerning the subject taught i.e., the mean scores of Mathematics and Science are 200.98 and 200.58 respectively, and Social studies and Languages mean scores are 196.03 and 193.80 each. Lastly, the mean scores of other categories are 196.95. Thus it can be concluded that school teachers teaching Mathematics subject has slightly higher digital competence than school teachers teaching other subjects.

Discussion, Educational implications and Conclusion

Discussion

According to the results of Digital Competence among school teachers with reference to Management, there is a significant difference in digital competence between government school teachers and private school teachers. Thus, private school teachers have higher digital competence when compared to teachers working in government schools. This may be due to better awareness and better infrastructure along with regular supervision in private schools as compared to government schools.

Another finding of the present study observed that there is a significant difference among school teachers regarding work experience. Among the categories such as Less than 2 years, 2 years to 5 years, 6 years to 10 years, 11 years and above, and Others, the school teachers having less than 2 years were found to have higher Digital Competence than those with more work experience. This may be because those school teachers comprise young and fresh graduates who are experts in ICT. Contradictory results have, however, also been reported by Benali et al. (2018) where the findings reveal that teachers with higher levels of digital teaching confidence are those with more years of experience.

Through this study, the researcher also identified that there were no significant differences among school teachers with reference to their subject taught. However, mathematics subject school teachers are found to have slightly higher Digital Competence than other subject teachers namely Science, Social Science, English and Other subject teachers. The probable reason may be because mathematics subject is mostly considered as a dull and challenging subject to many students therefore the teacher may be using digital tools in order to arouse the interest of the students in this subject which may have resulted in higher Digital Competence among the school teachers. These findings contradict the findings of Kozuh et al. (2021) which show that science and technology teachers apply digital tools while teaching more frequently than other subject teachers.

Educational Implications of the Study

Any research is useful and meaningful as long as it is fruitful in adapting to current educational changes and providing insights to guide the field in question to a higher level of achievement. An attempt was made to explore teachers' digital literacy regarding administration, work experience, and subjects taught. This study makes several valuable contributions to the educational system and the learning process of education as far as teacher quality is concerned.

Following are the main implications of this study:

1. The results indicate that those teachers with higher digital competence which comprise of young and fresh graduates tend to perform better and more effectively than those with lower levels of digital competence. Schools, school education departments, and governments at large should therefore take appropriate steps to provide regular digital literacy training to school teachers working in both public and private schools.

2. The importance of digital empowerment and ICT training of school teachers for quality education should be recognized by all concerned stakeholders to adapt to the urgency of the digitalization of education systems.

3. This research is of great importance because the digital skills of school teachers are a new trend in the education system to increase professional efficiency in teaching and to provide quality education to students.

4. Special efforts should be made to raise awareness of digital literacy among school teachers.

5. School education departments should take the lead in providing in-service training courses for secondary school teachers to improve their digital literacy skills.

Conclusion

The study investigated the level of Digital Competence among School Teachers. The sample of 400 teachers was drawn from the school teachers working in Government and Private Schools in Dimapur District. A glance at the findings of the result reveals that private school teachers have higher digital competence. It was also revealed that there is a significant difference among the school teachers with reference to work experience. The school teachers having less than 2 years of experience were found to have higher Digital Competence than those having more work experience. This study makes several valuable contributions to the education system regarding teacher quality. This research has significant educational implications related to teacher digital literacy and some of its key determinants. In today's world of increasing economic globalization and the digitization of education, there is an urgency to improve the digital competencies of teachers so that they can inspire new generations through well-informed guidance and decisions in educational practice.

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