ORIGINAL RESEARCH PAPER

Education

DIGITAL COMPETENCE AMONG RESEARCH SCHOLARS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT AND SELECTED DEMOGRAPHIC VARIABLES

KEY WORDS: Digital Competence, Research Scholars, Academic achievement, Demographic Variables

Manpreet Kaur (Ph.D) Research Scholar, Department of Education and Community Service, Punjabi University Patiala, Punjab

Dr. Meenakshi Sharma Professor, Department of Education and Community Service (Rtd.), Punjabi University Patiala, Punjab

ABSTRACT

In the present study digital competence and academic achievement of 100 research scholars of various streams of Punjabi University, Patiala were studied. Teachers' Digital Competence Scale by Ramkrishna (2017) was used to collect the data pertaining to the digital competence of research scholars and one demographic data sheet developed by the investigators was used to collect information about gender, stream of study, experience of research work and academic achievement. Gathered data were analyzed by using the statistical techniques. The results show that the level of digital competence of research scholars has various levels and no research scholar possess high level of digital competence. Academic achievement of research scholars has also various levels. There is no significant difference in digital competence of research scholars with regard to gender and research experience. There is significant difference in digital competence of research scholars with regard to stream of study. Research scholars from the stream of education and languages are less competent in digitalization as compared to the research scholars from the stream of engineering, management & science. Moreover, the high academic achievers are more digitally competent as compared to low academic achievers. Further, there is significant and positive relationship between digital competence and academic achievement. So we conclude that the high digital competence enhance the academic achievement.

INTRODUCTION

Digital competence is related to the knowledge, capacities and attitude of using digital technologies to consume, evaluate and create learning information and to collaborate and communicate with others for learning purposes (Janssen et al., 2013). Digital competence is more than just the ability to use software or to operate digital devices; it involves variety of complex skills- cognitive, psychomotor, sociological and emotional that the users need to have to use the digital environment effectively (Sharma & Sharma 2022). Digital competence is the set of knowledge, skills and attitudes required to use digital tools to solve problems, communicate, create and share content, manage information, collaborate and build knowledge appropriately, effectively, efficiently, reflectively, critically and ethically for work, leisure, learning, socializing, consuming and empowerment.

Due to the recent rise in epidemic and pandemic, the National Education Policy 2020 recognizes the importance of leveraging the advantage of technology. This policy recommends taking initiatives to use technology in teaching learning process at all levels from school to higher education. A research report, titled "Unlocking APAC's Digital Potential: Changing Digital Skills Needs and Policy Approaches" reveals that digitally skilled workers currently represent 12% of India's workforce. The research estimates that the number of worker in India having digital skills will need to increase nine times by 2025 and average workers in India will need to develop some new digital skills by 2025 to keep pace with the technological advancements and demand.

Ramakrishna (2017) conducted a study on 200 faculty members of Punjab University Chandigarh to find the teacher effectiveness in relation to self esteem, job satisfaction and digital competence. 4 departments were selected from 10 departments by lottery method of sampling. F ratio for the interaction between type of faculty and different levels of computer competence was not found to be significant even at 0.05 level of confidence.

Prado et al. (2020) conducted a case study to find gender differences in digital competence of teachers in training. The sample consisted of 329 first year students taking a degree in primary education teacher training at a Spanish faculty. The results revealed gender differences in students' reported perceptions of digital skills. Male were more likely to perceive themselves as competent in the use of ICTs, reporting better information management and online collaboration skills using digital media.

Gamez-Guillen et al. (2021) analyzed and compared the level of digital competence of higher education teaching staff in research work through the use of ICT resources. The sample comprised 1704 higher education teachers from all over Spain. The results showed that there were no significant differences in the level of digital competence of teaching staff in terms of gender. However, significant differences were found in digital skills, digital ethics, ICT anxiety, quality of ICT resources and intention to use ICT.

Mehrvarz et al. (2021) investigated the meditating role of digital informal learning between higher education students' digital competence and their academic performance. The data were collected from 319 students of Shiraz University of Iran. The results showed a positive effect of digital competence on academic performance.

Tekleselase (2021) conducted a study to identify the status of students and teachers digital competence in higher education. Data have been collected from 168 students and 64 teachers using a survey questionnaire and in depth interview with students and instructors. Findings showed that 88.09 % students use digital tools for non-academic purposes. However digital technology plays a great role on students' academic achievement especially for students who score more than 3.5 GPA. Further the digital competency of students and teachers is very low however they have access to digital technologies.

"Equipping students with digital competence as part of their higher education experience is necessary in order to empower their agency and identity in digital spaces" (Tekleselase, 2021).

Need and Significance of the study

We are living in era of technology and digital world. Digital India is a flagship program of Government of India with a vision to transform India into a digitally empowered society. According to this campaign there should be Wi-Fi in all universities, school books should be converted into e-books,

attendance in offices should be biometric, open data platform to easy access to information for citizens, IT for jobs etc. But there are many challenges for this program as majority of population in the country is still not qualified enough to use digital devices and technology. Most of the people could not use even the simple mobile phones (Shallu, 2019). But the COVID-19 has changed the academic landscape as students are forced to study remotely at home supported by a variety of digital tools. Accessing and developing digital competence of university students is vital for their success in higher education. Students with high digital competence can easily understand and interpret online learning material and perform well in online learning (Wang et al., 2021). There have been limited number of studies investigating students digital competence, particularly that of research scholars. This study aims to know the status of digital competence of research scholars. To drive the digital transformation within Indian higher education institutions, it is paramount to understand the technological skills and knowledge of students and to think of the measures through which these can be developed or increased.

Operational Definitions of Key Terms

Digital Competence:

Digital competence is the set of knowledge, skills and attitude (including abilities, awareness, values and strategies) that are required when using digital media to perform tasks; solve problems, create and share content, communicate, manage information, collaborate and build knowledge effectively, efficiently, appropriately and in the present study it will be measured by using Teacher's Digital Competence Scale developed by Ramkrishna (2017) which includes following factors:

i. Knowledge of digital practices.
ii. Expertise in using digital media for research work.
iii. Evaluating and Authorizing Online Information.
iv. Managing Digital data.
v. Collaborating and sharing digital information

Academic Achievement:

Percentage of marks in the masters' degree of that subject in which the researcher is doing research.

Research Scholars:

Research scholars are the students who are doing research on a particular subject.

Stream of Study:

Department in which the researcher is doing Ph.D.

Research Experience:

It refers to the number of years the researcher is doing research work. This time is divided into 2 parts; research experience less than two years and research experience more than two years.

According to the above mentioned contents and significance of the research about digital competence and its relationship with academic achievement, the following objectives and hypothesis are presented and considered in the current research:

Objectives

1. To study Digital Competence and Academic achievement among research scholars of Punjabi University Patiala.
2. To study Digital Competence among research scholars in terms of gender, stream of study and experience of research work.
3. To compare Digital Competence among research scholars in terms of gender, stream of study and experience of research work.
4. To compare Digital Competence among research scholars having high and low level of Academic Achievement.
5. To find out the relationship of Digital Competence with Academic Achievement.

Hypotheses

1. There will be no significant difference in digital competence among research scholars in terms of gender.
2. There will be no significant difference in digital competence among research scholars in terms of stream of study.
3. There will be no significant difference in digital competence among research scholars in terms of experience of research work.
4. There will be no significant difference in digital competence among research scholars having high and low level of Academic Achievement.
5. There will be significant relationship between digital competence and academic achievement.

Delimitations of the study

The study was delimited to research scholars of Punjabi University Patiala. The study was delimited to 100 research scholars from different departments of university; Department of Education, Department of Language(Hindi, Punjabi & English), Department of Science (Botany, Zoology, Chemistry and Physics), Department of Engineering & Technology and Department of Business Management & Commerce. These departments were classified into two categories i.e. Education & Languages and another is Engineering, Management & Science.

Sample

The sample of the present study was drawn only from Punjabi University Patiala. The sample comprised of 100 research scholars (50 male and 50 female) from different departments of University. 20 Research Scholars from department of education, 20 from languages, 20 from science, 20 from engineering & technology and 20 from business management and commerce, employing random sampling technique.

Tools Used

In the present study the investigators has employed Teacher's Digital Competence Scale developed by Ramkrishna (2017) to collect the data. Reliability of the tool by test- retest method is .89 and validity was checked by item analysis. There are 50 items in this scale. Maximum score is 250 and minimum score is 50.

There is no time limit to complete the scale. However, the usual time to finish this scale is 15-20 minute. One demographic data sheet developed by the investigators was also used to collect information about gender, stream of study, experience of research work and academic achievement.

Analysis and Interpretation of Data

Table 1 Frequency distribution table of digital competence scores of research scholars

Class interval	Frequency	Percentage	CPF
228-250	37	37	100
205-227	30	30	63
182-204	20	20	33
159-181	7	7	13
136-158	4	4	6
113-135	1	1	2
90-112	1	1	1
N	100	Mode	231
Mean	210.86	SD	29.29
Median	217	Range	156

From **Table 1** it is evident that the mean score of the sample in this study (N=100) came out to be 210.86 with SD of 29.29. The median is 217 and mode is 231. Further this table also depicts that 37% research scholars' lies above the mean interval i.e. 205-227, 30% lies in the mean interval and the rest 33% lies below the mean interval of digital competence.

Table 2 Digital competence of research scholars as per norms of the scale

Grade	N (Number of research scholars)	Level of Digital Competence
A.	----	Extremely High Digital Competence
B.	----	High Digital Competence
C.	39	Above Average Digital Competence
D.	33	Average/Moderate Digital Competence
E.	13	Below Average Digital Competence
F.	11	Poor Digital Competence
G.	04	Extreme Poor Digital Competence

Table 2 illustrates that no research scholar shows extremely high and high digital competence. 39% research scholars are above average competent to use digital tools and digital data. Whereas 11% research scholars are poor in digital competence & 4% are extremely poor in digital competence. It means that these 15 % scholars are completely dependent on others to present their research work digitally.

Table 3 Frequency distribution table of academic achievement scores of research scholars

Class interval		Frequency		Percentage	Cumulative peracentage frequency F
85-90		4		4	100
79-84		21		21	96
73-78		20		20	75
67-72		28		28	55
61-66		17		17	27
55-60		10		10	10
N	Mean	Median	Mode	SD	Q1 =65
100	71.40	70	68	8.04	Q3 =78.15

High achievers score >=78.15
Low achievers score <=65

Table 3 shows that 27 % research scholars have Academic Achievement scores less than mean interval i.e. up to 67- 72 as compared to 45% research scholars above mean interval and 28 % research scholars are in mean interval. 25% research scholars are high achievers in academic achievement and 27% are low achievers.

Table 4 Digital competence among Research Scholars in relation to Gender, their Research Experience, Stream of study and High & Low Academic achievement

Variable	N	Mean	SD	t-ratio
Gender				
Male	50	212.3	26.64	0.49
Female	50	209.42	31.91	
Research Experience (Years)				
< 2 years	59	207.75	27.77	1.25
>2 years	41	215.34	31.13	
Streams				
Education & Languages	40	197.53	33.02	3.71**
Engineering,Management & Science	60	219.75	22.75	
Academic Achievement				
High	25(>=Q3=78.15)	225.04	22.86	3.04**
Low	27(<=Q1=65)	203.19	28.75	

****significant at 0.01**

Table 4 shows that the difference between mean digital competence scores of male and female research scholars is not significant as t value is 0.49 which is less than the table value. So the null is accepted that there is no significant difference in digital competence in terms of gender. The result is supported by Gamez-Guillen et al. (2021) who also found no difference in digital competence in terms of gender. Further, it is evident from the result that there is no significant difference in digital competence of experienced research scholars and less experienced research scholars as t value is 1.25 which is less than the table value. Hence the hypothesis is accepted. Moreover, the null hypothesis that there is no significant difference in digital competence in terms of stream of study is rejected as the digital competence of engineering, management & science streams research scholars is high as compare to education and languages streams research scholars. According to the next result, the difference between mean digital competence scores of high academic achiever scholars and low academic achiever scholars is significant. So the null hypothesis is rejected, which states that there is no significant difference in digital competence of high academic achievers and low academic achiever scholars. It concludes that the high academic achievers possess more digital competence as compare to the low academic achievers as the mean score of high achievers is greater than low academic achievers. The result is supported by Mehrvarz et al. (2021) who stated that digital competence is positively correlated with their academic performance.

Table 5 Coefficient of correlation between digital competence and academic achievement

Variable	N	Degree of freedom	Correlation
Digital Competence	100	98	0.35**
Academic achievement			

****significant at 0.01 level**

Table 5 indicates that coefficient of correlation between digital competence and academic achievement is positive and significant. The result clearly indicates that digital competence is correlated with academic achievement.

Conclusions and Recommendations

- Analysis of the data shows that the digital competence of the research scholars is not up to the desired level. So the higher education institutions should have strategic digital policy or legal framework and initiatives fostering on how to use digital technologies in higher education.
- Digital Competence of scholars from Education and Languages departments is less as compare to scholars from Engineering, Management & Science. But in the present era of digitalization, most of the learning material is available and easily accessible through internet and after Covid pandemic students are forced to learn and present their work through variety of digital tools. So let us increase the digital competence of students of every stream through proper digital workshops and digital libraries
- Digital competence is positively correlated with the academic performance of the research scholars. Thus we can argue that the digitally learning environment can genuinely improve students' academic performance.

REFERENCES

1. Canal, M. N., Obesso, M. M. & Rivero, C. A. P. (2022). New challenges in higher education: A study of the digital competence of educators in Covid times. *ScienceDirect,* Retrieved from https://doi.org/10.1016/j.techfore.2021.121270
2. Gamez-Guillen, F. D., Mayorga-Fernandez, M. J. & Contreras-Rosado, J. A. (2021). Incidence of Gender in the Digital Competence of Higher Education Teachers in Research Work: Analysis with Descriptive and Comparative Methods. *Education Sciences, 11*(98), 1-6. Retrieved from https://doi.org/10.3390/educsci11030098
3. Janssen, J., Stoyanov, S., Ferrari, A., Punie,Y., Pannekeet, K. & Sloep, P. (2013). Experts' views om digital competence: Commonalities and differences. *Comput. Educat. 68*, 473-481. doi: 10.1016/j.learninstruc.2010.07-006
4. Mehrvarz, M., Heidari, E., Farrokhnia, M. & Noroozi, O. (2021). The mediating role of digital informal learning in the relationship between students' digital competence and their academic performance. *Computers & Education*, *167*, 1-13. Retrieved from https://doi.org/10.1016/j.compedu.2021.104184

5. Moore, P. (2022). New report: Asia Pacific workforce applying digital skills will need to increase five-fold by 2025. *Amazon Web Services.* Retrieved from aws.amazon.com
6. Prado, M. G., Canon, R., Martin, S. G. & Canton, I. (2020). Digital Competence and Gender: Teachers in Training. A Case Study. *Future Internet, 12*(204), 1-15.
7. Ramkrishna (2017). *Teacher effectiveness in relation to self esteem, job satisfaction and digital*
8. *competence. Ph.D. thesis in education.* Punjab University, Chandigarh.
9. Rajeswaran, M. C. (2019). Lack of digital competence: The hump in a university- English for specific purpose-classroom. *International Journal of Scientific and Technology Research, 8*(10), 948-956.
10. Shallu, Sihmar, D. & Meena, R. V. (2019). Digitalization in India: An Innovative Concept. *IJDER, 7*(1), 452-456.
11. Sharma, R. K. & Sharma, D. (2022). Digital Literacy and Competence for Educators. *SRJHSEL, 10* (50), 12362-12368.
12. Tekleselase, H. (2021). Usage of digital technology in higher education: Teacher and Student digital competency. *J Electr Eng Electron Technol, 10*(5), 1-7.
13. Wang, X., Zhang, R., Wang, Z. & Li, T. (2021). How does digital competence preserve university students' psychological well- being during the pandemic? An investigation from self- determined theory. *Front. Psychol*. 12:652594. doi:10.3389/fosyg.2021.652594