A Critical Examination of Digital Competency among Postgraduate Students of Burdwan University

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

In the age of continuous transformation, keeping in view the gradual increase in the usage of digital platforms, this study aims to explore digital competency among postgraduate students of Burdwan University. In this study, researchers have used a standardized questionnaire developed by Tzaflkou et al. [1] consisting of 28 items. 5- The Point Likert scale has been used for this research. Among randomly selected 112 respondents 65 were boys and 47 were girls in this study. The researchers used the "t-test" to analyze the data. The evaluated data revealed an insignificant difference in digital competency between male and female postgraduate students, whereas a significant difference in digital competency at .05 level between postgraduate students belonging to the arts and science stream prevailed here. Between Urban and rural postgraduate students, there

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was a significant difference at 0.05 level. The justification of this study shows that digital competence can make students more capable, and more job-oriented than before. The recommendations regarding digital competency for students, teachers, and overall educational institutions proved that it is essential for upgrading themselves and coping with the modern world. In conclusion, the study revealed that the proposed scale could be utilized for new acts and schemes regarding lifelong learning, and planned modifications, in the solitary areas for the betterment of people including students.

Keywords: Digital competence; digital skill; post graduate students; digital technology.

1. INTRODUCTION

There is no permanent habit in human life. It becomes dynamic with the changes of time and situation. Many factors are responsible for these changes. Technology is one of the main factors among them. Since the last of the 19th century, digital platforms have started their journey to replace traditional beliefs, methods, and skills, bringing radical change to the so-called orthodox society. The uses of digital platforms make a man's life easier as it saves time, energy. People are getting intensified globally in terms of upgraded thoughts, knowledge, skills, habits, and perceptions. These all together lead to an attitudinal change of a common man. Now it's a matter of concern what digital competency is. Till today digital competency is used as a synonymous form of digital literacy. Digital competency is the confined or elaborate form of digital literacy, media studies, digital devices, ICT skills, internet skills, and digital skills. In the 20th century the word 'digital skill' was massively used instead of 'digital competency'. The digital skill was limited within the professional field and there was no importance of individualization. But the 21st century has widened the area of 'digital skill' which is called 'digital competency'. 'Social skills' is emphasized and 'individualization' is prioritized in this digital competency arena [2].

Understanding the relationship between "skills" and "competence" is crucial. The OECD's (The Organization for Economic Cooperation and Development) DeSeCo (Definition and Selection of Competencies: Theoretical and Conceptual Foundations) study highlights a useful contrast between the two:

"A competence is more than just knowledge or skills. It involves the ability to meet complex demands, by drawing on and mobilizing psychosocial resources (including skills and attitudes) in a particular context. For example, the ability to communicate effectively is a competence that may draw on an individual's knowledge of language, practical IT skills, and attitudes towards those with whom he or she is communicating" (Rychen & Salganik, 2003).

The European Commission (2007) defines capability as an amalgamation of context-appropriate knowledge, abilities, and attitudes. Among other conceivable capabilities, essential abilities are those that all people require for their development and advancement, participation in society, integration into society, and work.

Digital competency is an evolving and more recent concept though it is not mandatory to have a professional degree regarding this. It is more than a skill and it is even more than mastery of knowledge. Digital competency is the efficiency of profound knowledge of dealing something with a more complicated, more crucial, more reflective, more productive matter in an effective way.

The ability to manage various technological, academic, and pedagogical components is supported by digital competency, (Mishra & Koehler, 2008) which is therefore seen as beneficial for the students, especially for higher education. Post-graduation students are in a transition period where they step forward from casual student life to the battlefield of hardcore reality. They struggle for existence in terms of professional, financial, and academic too. In this age of digitalization, where we are moving forward from the manual arena to the digital arena, competency in digital platforms is very much essential to overcome these problems related to the professional, financial, and academic area.

So, a good sense and proper implementation of digital platforms is necessary for a postgraduate student. Here this paper has tried to find out the digital competency among postgraduate students of Burdwan University.

1.1 Justification of this Study

In today's environment, technological advances are becoming immensely crucial to economic activity and civilization. To remain economically viable, educational institutions must keep up with the evolving digital landscape, thus there is a high need for capabilities that did not exist a few years ago. As a result, to remain employed, individuals have to constantly enhance themselves.

Why is Digital Competence Important for Educational Institutions?

The benefit of having digital competence among students: Developing a workforce with a wide range of digital abilities provides various advantages to educational institutions. Being able to adopt novel tools in the institutions helps to well-organized knowledge flows, resulting in less time spent on monotonous duties and pupils liberated to focus their attention on more important work that helps both them and their institution to reach priorities.

Overall, the greater effectiveness of digital technology allows organizations to be more productive and dynamic. This creates an engaging and effective working atmosphere, resulting in increased personnel support and achievement.

Students wishing to enter the job market may find that having digital abilities can help them stand out amid a plethora of potential prospects. With a significant number of vacant positions demanding digital skills, studying a variety of these talents is one of the best methods to boost the probability of getting recruited for your preferred position.

Nowadays, many jobs are exclusively listed digitally. Even before the interview stage, resumes reflect the level of digital skills, which the workplace will be searching for. Many employment notices incorporate a variety of web-based exams and forms to evaluate the skills one has before an inquiry. Developing the necessary digital abilities could be beneficial in getting through these initial evaluations and moving on to the next step of the selection procedure.

1.2 Statement of the Problem

A critical examination of digital competency among postgraduate students of Burdwan University

1.3 Significance of the Study

The slow but steady jump from manual to the frequent use of digital platforms is the new perspective of life that can be the main outcome of Digital Competency. The graduation stage can be said as the basement for entering a new phase of life. In the case of professional, personal, or higher studies digital competency is required in every sphere of life. For those who are getting engaged in marriage or involved in any kind of family affairs, digital competency rather than digital knowledge is essential for them to deal with those affairs smoothly. The better digital skills one has, he/she will receive an extra advantage for any kind of advancement whatever the field is. To become capable in the digital field, a particular sector is not necessary. But to perform quite effortlessly, to save time, to make his / herself well equipped with time-appropriate, contemporary knowledge with the realization of good or bad, with the awareness of what to take or what not in life, and with the understanding to apply it properly digital competence is very much needed.

National Education Policy 2020 emphasized digital education. It aimed to enhance the use of technology in all facets of education is another goal of NEP 2020. To strengthen online learning, it places a special emphasis on resources including learning apps, satellite-based educational TV channels, and teacher capacity building in addition to digital material. The National Educational Technology Forum (NETF), an independent organization, was created by the government to improve digital learning systems throughout the nation. The NETF's job is to make it easier for people to make decisions about how to deploy, introduce, and use technology to achieve NEP 2020 goals. The NEP framework sees technology as the key enabler for national universal education.

1.4 Objectives of the Study

The objectives of this study are as follows-

1. To find out whether any difference exists between males and females in the digital competency of postgraduate students at Burdwan University.
2. To find out whether any difference exists between rural and urban students at the postgraduate level regarding digital competency.

3. To find out whether any difference exists among arts, and science students at the postgraduate level regarding digital competency.

1.5 Hypotheses

The hypotheses of this study are as follows-

H_01: There is no significant difference in digital competency between male and female postgraduate students.
H_02: There is no significant difference in digital competency between urban and rural postgraduate students.
H_03: There is no significant difference in digital competency between arts and science postgraduate students.

1.6 Delimitation of the Study

1. The study has been delimited to the postgraduate students of the Arts and Science Departments of Burdwan University only.

2. REVIEW OF RELATED LITERATURE

Kantosalo et al. (2011), developed research on "Digital Competence". The main objective of this paper was to analyze digital literacy or information literacy. To date, these technical terms have been used as a synonym for digital competence which is not correct. ICT, literacy skills, digital divide of the 21st century have played a vital role in increasing digital competency. In conclusion, it can be said the scope and content of digital skills need to be modified.

Pimdee et al. (2017), researched "Investing Competencies for Under Graduate Students at Nakhon Thammarat Rajabhat University". The main objective of this study was to evaluate ICT competencies in the cognitive and psychomotor domains of undergraduate students of that particular university. This paper involved focus group discussion including 131 variables. As a result, it was found that the ICT competencies of students consisted of 7 elements that cover the cognitive and psychomotor domains.

Parmer and Pateria [3], "developed research on "Digital Information Literacy Competencies among PG students of CCS Haryana Agricultural University, Hisar: A study. This paper aimed to study information literacy skills among PG students of that university. Identifying the perception of users, and finding awareness of various potential of digital resources were also the objectives of this paper. The paper used a questionnaire with 45 questions and 67 respondents. The findings of this study were that a particular number of students at this university were not capable of using different digital resources. As a result, it can be said that a well-equipped literacy program and effective training schedule could only be the antidote to reducing this kind of illiteracy.

Vishnu et al. [4], researched "Digital Competence of higher education learners in the context of Covid-19 triggered online learning". The objective of this paper was to analyze socio-economic background and learners' competency as they provide a direct influence on digital competence. The Digital Competence Framework 2.0 of EO Science Hub (DIGCOMP) was used for this study. From this paper, it was found that student's digital competence was very important as today's learning environment was incomplete, and insufficient without this kind of fundamental knowledge.

Scholes et al. [5], conducted research on "Video gaming and Digital Competence among elementary school students". Total evaluation of elementary school student's digital self-efficacy to build up their perception of digital competency was the objective of this study. This paper involved a Survey instrument – School Activities Attitude Questionnaire (SAAQ). Three-point Likert scale was used for this purpose. The findings of this study were that this paper had different educational implications, irrespective of gender. However socio-economic background has played a vital role in pursuing digital competence.

Tzafilkou et al. [1], explored research on "Development and validation of student's digital competency scale (SDiCos). The main objective of this paper was to execute and validate the digital literacy scale for students in higher education. The scale included 156 UG and PG students just before the start of COVID-19 situations. A questionnaire consisting of 56 items with four dimensions was used for this purpose. This paper concluded by saying that the design of modified action, policies towards adult education, and remote education would benefit from this scale.

Borboutidis and Stiakakis [6], explored a study on "Identifying the factors to enhance Digital Competence of students at Vocational Training Institute". The main objective of this paper was to analyze the factors that left a significant impact on the Digital Competence of students. This paper used 3 types of research design. Survey method 2. Self–assessment questionnaire 3. Laboratory computer-based performance. The purpose of this study was to reveal different domains of Education and advice new educational practices in the arena of Employee selection and lifelong learning which are directly or indirectly effected by digital competence.

Gonzalez et al. (2023), conducted research on Explanations of pupils' digital competency levels through theoretical models. The research presented in this article made use of a cross-sectional design. This study set out to answer the question, "What factors affect students' digital competence in solving technical problems?" by looking at data from 12–14-year-olds. The results showed that digital   competence was not directly affected by factors such as gender, attitude, or problem-solving ability.

Research Gap: Nowadays this topic is the most discussed and criticized one. A lot of work on this topic has already been done in India or outside of India. West Bengal is also witness of this type of work. Researchers also conducted many studies on digital competency based on gender and residential area. But very few of them emphasized the stream (arts/science) of the students. Here, researchers have tried to include this dimension in this study. Researchers also have tried to implement [1] digital competency scale in the Indian context. Another gap has been found from the previous studies that remarkable work on postgraduate students was not getting importance properly. So, the researchers have chosen this area for their research.

3. RESEARCH METHODOLOGY

3.1 Population: All PG students of Burdwan University are considered in this Study as Population

Sample: A stratified random sampling method has been used for collecting data. Students were chosen randomly from different strata viz. Arts/Science, Urban/Rural, and Male/Female for the research study. The total number of the sample was 112. The sample was collected from the postgraduate students of different departments of Burdwan University. The distribution of samples in different strata is listed in Table 1.

Table 1. Distribution of samples in different strata

Arts	Science	Urban	Rural	Male	Female
61	51	42	70	65	47
Total = 112		Total = 112		Total = 112	

3.2 Research Tool

A well-structured standardized questionnaire consisting of 28 items developed by Tzaflkou et al. [1] is adopted for this study. 120 questionnaires are randomly distributed among students. Among them, 112 respondents have provided their sincere response which is 93% through a questionnaire. The study used a 5-point Likert Scale consisting of "strongly agree" to "strongly disagree" and vice versa. The collected data was tabulated, analyzed, and interpreted in the following section.

4. ANALYSIS OF DATA

The analysis of data means the classification, arrangement, and framing according to the objectives and briefing of the answers to the questions collected from the questionnaires. Here some of the scores are calculated by Microsoft Excel and others by hand. In this study, a t-test has been used for analyzing and comparing the data set.

5. RESULTS AND DISCUSSION

H_{01}: There is no significant difference in digital competency between male and female postgraduate students.

Table 2. Digital competency: Comparison between male and female students

Group	Sample(N)	Mean (M)	S.D	t-value	Level of significance
Male	65	116.35	11.41		
Female	47	114.53	11.59	0.83	Insignificant

Here the average digital competency of female students is 114.53 the digital competency of male students is 116.35, female students' SD is 11.59, and male students is 11.41. Here the t-value is 0.83. It is seen from the t-table that the value is insignificant at the 0.05 level. So, the null hypothesis is accepted at the .05 level. Thus, we may say that

There is no significant difference in digital competency between male and female postgraduate students.

H_{02}: There is no significant difference in digital competency between urban and rural postgraduate students.

Table 3. Digital Competency: Comparison between urban and rural students

Group	Sample (N)	Mean (M)	S.D	t-value	Level of significance
Urban	42	118.60	12.04		Significant
Rural	70	113.79	10.81	2.13	At 0.05 level

From the above Table 3, we see that the average digital competency of urban students is 118.60 and the digital competency of rural students is 113.79; the SD of urban students is 12.04 and that of rural students is 10.81. Here the t-value is 2.13. It is seen from the t-table that the calculated value of t is significant at 0.05 level. So, the null hypothesis is rejected at the .05 level. So, we may infer that.

There is a significant difference in digital competency between urban and rural postgraduate students at the .05 level.

H_{03}: There is no significant difference in digital competency between arts and science postgraduate students.

Table 4. Digital competency: Comparison between arts and science students

Group	Sample(N)	Mean(M)	S.D	t-value	Level of Significance
Arts	61	113.38	11.19		Significant at 0.05 level
Science	51	118.24	11.36	2.27	

Here the average of the digital competency of arts students is 113.38 and the digital competency of science students is 118.24; the SD of arts students is 11.19 and that of science students is 11.36. Here the t-value is 2.27. It is seen from the t-table that this value of t is significant at 0.05 level. So, the null hypothesis is rejected at the .05 level and it may be stated that

There is a significant difference in digital competency between arts and science postgraduate students at the .05 level.

In this study, the researcher found that there is an insignificant difference in digital competency between male and female students of post-graduation level. These results are consistent with the earlier studies of Gil-Juarez, A. et al. [7], Sanchez Prieto, J. [8], Galindo-Domínguez, H [9]. It shows that not only the number of female students has gradually increased in the different sectors of education but also the quality of their education, their tendency to use digital platforms has also increased which influences their competency level.

The findings revealed that there is a significant difference between post-graduate students of urban and rural students. The findings of this investigation are congruent with Rundel, C. & Salemink, K [10]. They came to study in an urban area rather than at Burdwan University. However, their orientation is still related to rural areas where students are still deprived of

different types of technological support. Today becoming digitally sound is like a dream to a lot of students who come from rural areas [11-13].

Another finding of this study is that there is a significant difference between postgraduate students of Arts and Science. The result is quite obvious. The cause behind it may be up to now the students who belonged to the arts faculty are still underdeveloped than those students who belonged to the science faculty. The science background students receive special encouragement to learn technology skills and support to stay connected with new technologies. The science students and their laboratory work have to go through a constant enrichment of upgraded knowledge than arts students. For this, they must be digitally sound or competent enough to deal with digital platforms. As a result, they become more competent in the digital field than arts students [14-16].

6. LIMITATIONS OF THE STUDY

Every study has its limitations. This study is also not an exception. The limitations of this study are as follows-

1. The samples are limited to 112 PG students only.
2. Digital competency is measured using a standardized scale only. Other tools would be more useful for this purpose.

7. RECOMMENDATIONS

There are some recommendations regarding digital competence including student, teacher, etc. They are discussed here briefly.

Encourage creative teaching with digital competency:

- **Instruction for Teachers:** Training for educators should focus on advanced digital competence and teaching, rather than just ICT user skills. These themes should be covered both in the basics and during teacher training.
- **Acquiring digital skills considering circumstances:** To motivate pupils to utilize ICT for education, knowledge looking for and producing tasks. Students learn to use technology and media creatively in various subjects, including looking for appropriate data, assessing

consistency, IPR considerations, and producing essential information.

- **Advanced methods of instruction also promote digital competency:** ICT for learning can involve learners and promote research, hands-on training, and abilities to solve problems. These abilities promote improved digital competence, including communication via the Internet as well as assured use of digital tools.

Integrate digital competency into Institutional plans:

- **Consciousness of the significance of digital competency:** Teachers, school leaders, and parents should prioritize advanced digital competency. A systematic strategy for professional instruction and skill updating should be developed, as well as teacher assistance programs and systems, with digital resources included in the organizational setting for education.
- **Incorporate digital competency most comprehensively throughout all curriculums:** Educational policy should incorporate digital literacy from primary and it should continue throughout the curriculum of the whole educational journey. The curriculum of overall education should focus on developing digital skills, including self-assurance, analytical thinking, and originality.
- **Promote digital competency in lifelong learning initiatives:** Lifelong learning plans must emphasize digital competence, as ICT is increasingly used for leisure, learning, and jobs in various domains.

Recognize technical breakthroughs and utilize them:
- **Regularly review digital skills techniques:** the use of social computing tools has transformed the concept of digital competence, asking for innovative abilities in working together, exchanging, transparency, refraction, and building individuality as well as addressing obstacles such as data integrity, confidence, accountability, confidentiality, and stability continuous review is needed.
- **Facilitate informal education in flourishing Internet groups**
- **Integrate digital competence and e-skills**

8. CONCLUSION

Digital competency is now a basic requirement to create a technically sound productive society. The importance of digital literacy is rising alongside that of other forms of literacy. So, it can be said that to empower every individual with these abilities, the National Digital Literacy Mission (NDLM) was launched by the Indian government to promote digital literacy which leads to digital competency. Instruction and training in the use of digital tools should be made available to all students at every level to encourage them to develop digital literacy which will make them digitally competent for their future upliftment.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Tzafilkou K, Perifanou M, Economides AA. Development and validation of students' digital competence scale (SDiCoS). International Journal of Educational Technology in Higher Education. 2022;19(1):30.
2. Ilomäki L, Kantosalo A, Lakkala M. What is digital competence. Linked portal. 2011;1-12.
3. Parmar S, Pateria RK. Digital information literacy competencies among pg students of ccs Haryana agricultural university, Hisar: A study. International Journal of Information Dissemination and Technology. 2020;10(2):88-93.
4. Vishnu S, Sathyan AR, Sam AS, Radhakrishnan A, Ragavan SO, Kandathil JV, Funk C. Digital competence of higher education learners in the context of COVID-19 triggered online learning. Social Sciences & Humanities Open. 2022;6(1):100320.
5. Scholes L, Rowe L, Mills KA, Gutierrez A, Pink E. Video gaming and digital competence among elementary school students. Learning, Media and Technology. 2022;1-16.
6. Barboutidis G, Stiakakis E. Identifying the factors to enhance digital competence of students at vocational training institutes. Technology, Knowledge and Learning. 2023;28(2):613-650.
7. Gil-Juarez A, Vitores A, Feliu J, Vall-Llovera M. Digital gender gap: A review and a proposal. EKS. 2011;12: 25-53.
8. Sánchez Prieto J, Trujillo Torres JM, Gómez García M, Gómez García G. Gender and digital teaching competence in dual vocational education and training. Education Sciences. 2020; 10(3):84.
9. Galindo-Domínguez H, Bezanilla MJ. Digital competence in the training of pre-service teachers: Perceptions of students in the degrees of early childhood education and primary education. Journal of Digital Learning in Teacher Education. 2021; 37(4):262-278.
10. Rundel C, Salemink K. Bridging digital inequalities in rural schools in Germany: A geographical lottery? Education Sciences. 2021;11(4):181.
11. Adams T. What is the importance of digital skills in the workplace? The Hub| High-Speed Training; 2022.
12. Ala-Mutka K, Punie Y, Redecker C. Digital competence for lifelong learning. Institute for Prospective Technological Studies (IPTS), European Commission, Joint Research Centre. Technical Note: JRC. 2008;48708:271-282.
13. Biradar K, Naik KJ. Digital literacy skills and competencies among the research scholars and PG students of deemed university libraries, Bangalore: A Study. Journal of Advances in Library and Information Science. 2017;3(6): 252-257.
14. Inamorato dos Santos A, Chinkes E, Carvalho MA, Solórzano CM, Marroni LS. The digital competence of academics in higher education: Is the glass half empty or half full? International Journal of Educational Technology in Higher Education. 2023;20(1):9.
15. Morze N, Kuzminska O, Mazorchuk M, Pavlenko V, Prokhorov A. Digital competency of the students and teachers in Ukraine: Measurement, analysis, development prospects. Information and Communication Technologies in

Education, Research, and Industrial Applications, Communications in Computer and Information Science. 2018;2104:366-379.

16. Suwanroj T, Leekitchwatana P, Pimdee P. Investigating ICT competencies for undergraduate students at nakhon si thammarat rajabhat university; 2017.

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