DIGITAL LITERACY AMONG BACHELOR OF EDUCATION STUDENTS AT THE OPEN UNIVERSITY OF SRI LANKA

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Digital literacy has become a critical skill set for students in higher education, especially in the context of rapidly evolving digital environments. This study, which investigated the digital literacy skills of Bachelor of Education (Natural Sciences) students at the Open University of Sri Lanka (OUSL), is of significant importance. The research focused on identifying key digital literacy skills, such as information literacy, technology operations and concepts, communication and collaboration, problem-solving and critical thinking, and safety and security, as well as examining potential differences based on gender. A survey research design was employed, and data was collected from 40 students through a structured questionnaire validated for clarity and content. The results indicate a generally moderate to high level of proficiency across the digital literacy skills, with the highest average scores in safety and security. In contrast, communication and collaboration skills were relatively lower. Statistical analysis using the Mann-Whitney U test revealed no significant gender differences in digital literacy across the examined categories, suggesting comparable levels of digital proficiency among male and female students. These findings underscore the importance of enhancing digital literacy education for all students and improving communication and collaboration skills. This study recommends integrating more targeted digital literacy training into the curriculum to address the identified gaps and ensure that all students are well-prepared for the demands of the digital age.

Keywords: Digital Literacy, Gender Differences, Open and Distance Learning (ODL), Undergraduates

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Introduction

Literacy represents a continuous journey of acquiring and enhancing reading, writing, and numeracy skills throughout one's life. It encompasses a broader range of abilities beyond basic reading and writing, including digital skills, media literacy, education for sustainable development, global citizenship, and specialised job skills. Bashar and Naaz (2024) emphasise that the UNESCO Institute for Statistics (2008) defines Digital Literacy as the capability to safely and appropriately access, manage, understand, integrate, communicate, evaluate, and create information using digital technologies, particularly for employment, decent jobs, and entrepreneurship. This concept includes skills commonly referred to as computer literacy, ICT literacy, and information literacy.

The term "digital literacy" was first introduced by Paul Glister in 1997, who described it as the ability to comprehend information and utilise it through computers and the internet in various ways. He argued that digital literacy involves more than just computer skills; it encompasses the ability to communicate knowledge on digital platforms (Bashar & Naaz, 2024). According to Covello (2010), information literacy is a sub-discipline within digital literacy, including computer and media literacy, and visual comprehension, as well as technological and communication literacy. Furthermore, the European Commission (2018) emphasises that digital literacy is essential for personal integration and development within society. Nguyen and Habok (2023) highlight that digital literacy can be understood to encompass six sub-cognitive literacies: photo-visual literacy (understanding multimedia information), reproduction literacy (creating cohesive products from various sources), branching literacy (organising and interacting with available information), information literacy (critically evaluating information), socio-emotional literacy (following digital norms), and real-time thinking literacy (processing multiple stimuli simultaneously).

Digital literacy involves the confident and innovative use of technology to address the needs and challenges of everyday life in a digital world. Digitally literate individuals can efficiently find, evaluate, and utilise information from technology for their daily activities. The development of digital technology has transformed our interactions with the world and our daily routines. Digital literacy education enhances awareness of the digital landscape by instructing people on how to use technology and digital tools to fulfil their fundamental needs. Witt and Gloerfeld (2017) emphasise the importance of digital literacy, highlighting its role in teaching individuals how to navigate and utilise technology effectively in the digital world. This is especially critical in education due to the growing reliance on technology for learning.

The Fourth Industrial Revolution has made Information and Communication Technologies (ICT) ubiquitous in all aspects of life. Universities must equip their students with ICT skills and digital literacy to prepare them for the workforce, lifelong learning, and responsible participation in our

technology-driven world. Traditional methods of information gathering are no longer sufficient; the explosion of online publications necessitates a new skill set: digital literacy. This encompasses the critical thinking, information management, and ethical values needed to navigate the vast online landscape (Brankov, 2022). The internet and digital revolution have significantly impacted how students learn and integrate technology. Technology has transformed communication, collaboration, problem-solving, and access to information (Simpson & Obdalova, 2014). Mastering digital literacy, a 21st-century skill, is essential for undergraduate students to succeed in this new paradigm. Education must move beyond traditional methods and embrace digital formats to leverage the vast online learning resources available across various disciplines.

The Faculty of Education at the Open University of Sri Lanka (OUSL) offers a Bachelor of Education (B.Ed.) (Natural Sciences) programme through the open and distance learning (ODL) mode. The programme requires all incoming students to complete continuing education courses that provide basic ICT and digital skills to prepare new students for this ODL system. However, B.Ed. (Natural Sciences) graduates are expected to be proficient in using digital tools and resources to create engaging and effective learning experiences. Therefore, it is crucial to investigate the extent of digital literacy among these undergraduate students.

Aim and objectives: This research aimed to investigate the digital literacy skills of B.Ed. (Natural Sciences) students at OUSL. The following objectives were formulated to achieve the aim of the study:

- To identify the various digital literacy skills among B.Ed. (Natural Sciences) students such as information literacy, technology operation and concepts, communication and collaboration, problem-solving and critical thinking, and safety and security; and
- To determine the differences in digital literacy among students based on gender.

METHODOLOGY

This study employed a survey research design with a questionnaire to collect data from a sample of B.Ed. (Natural Sciences) students at OUSL. A convenient sampling technique was used to select 40 students from different academic years of the programme. A structured questionnaire was developed based on the research objectives and validated for both face and content validity. A pilot survey with ten students not included in the sample ensured the questionnaire's clarity and comprehensibility. It consisted of five sections: *Information Literacy, Technology Operations and Concepts, Communication and Collaboration, Problem-Solving and Critical Thinking, and Safety and Security.* Data analysis was aligned with the research objectives. SPSS version 26 was used for data analysis. The following non-parametric statistical tests were used due to the non-normal distribution of the data. A significance level of $\alpha = 0.05$ was applied to all statistical tests.

Objective 1: Mean and Standard Deviation scores of B.Ed. (Natural Sciences) students across different digital literacy skills areas and
Objective 2: The Mann-Whitney U test compared the median scores of male and female students for each digital literacy skill, considering gender differences.

RESULTS AND DISCUSSION

Digital Literacy Skills Possessed by B.Ed. (Natural Sciences) Students at OUSL

To identify the various digital literacy skills possessed by B.Ed. (Natural Sciences) students at OUSL, the mean and standard deviation scores were calculated. Table 1 shows the analysis of digital literacy skills among the students at OUSL, which reveals a generally moderate to high level of proficiency across various areas. The highest average score in safety and security is observed, suggesting strong competence in this domain. Conversely, communication and collaboration have the lowest average score, indicating a relative area of weakness compared to other skills. The variability in scores, particularly in problem-solving and critical thinking, highlights differences in individual student abilities within these skill areas. This suggests that while many students are adept at using digital tools and resources, there is still room for improvement, especially in enhancing communication and collaboration skills.

Table 1: Mean and Standard deviation on Student Digital Literacy

	N	Mean	Std. Deviation
Information literacy	40	3.5156	.94360
Technology operation and concepts	40	3.4969	1.04102
Communication & collaboration	40	3.0964	.89559
Problem-solving and critical thinking	40	3.4964	1.10135
Safety and Security	40	3.6786	1.04090

Gender Differences in Digital Literacy Skills among B.Ed. (Natural Sciences) Students

Several non-parametric tests were employed to assess the differences in digital literacy skills among B.Ed. (Natural Sciences) students at OUSL. The Mann-Whitney U test was used to compare the median scores of digital literacy skills between male and female students.

Table 2 presents the ranks obtained from this test, highlighting the differences in digital literacy skills between these two groups.

Table 2

The ranks table of the Mann-Whitney U test of digital literacy skills between male and female students

	Gender	N	Mean Rank	Sum of Ranks
Information literacy	Female	29	19.57	567.50
	Male	11	22.95	252.50
	Total	40		
Technology operation and concepts	Female	29	19.28	559.00
	Male	11	23.73	261.00
	Total	40		
Communication & collaboration	Female	29	20.10	583.00
	Male	11	21.55	237.00

	Total	40		
Problem-solving and critical thinking	Female	29	19.41	563.00
	Male	11	23.36	257.00
	Total	40		
Safety and Security	Female	29	20.14	584.00
	Male	11	21.45	236.00
	Total	40		

Furthermore, the Mann-Whitney U test revealed significant differences in digital literacy skills between male and female students across five key areas: information literacy, technology operation and concepts, communication and collaboration, problem-solving and critical thinking, and safety and security. Table 3 presents the differences in digital literacy skills between male and female students.

Table 3
The Mann-Whitney U test of digital literacy skills between male and female students

	Information literacy	Technology operation and concepts	Communication & collaboration	Problem-solving and critical thinking	Safety and Security
Mann-Whitney U	132.500	124.000	148.000	128.000	149.000
Wilcoxon W	567.500	559.000	583.000	563.000	584.000
Z	-.849	-1.111	-.361	-.986	-.330
Asymp. Sig. (2-tailed)	.396	.266	.718	.324	.741
Exact Sig. [2*(1-tailed Sig.)]	.419[b]	.294[b]	.743[b]	.353[b]	.765[b]

Referring to Table 3 for information literacy, the Mann-Whitney U value is 132.500, with a Wilcoxon W value of 567.500 and a Z-score of -0.849. The asymptotic significance (two-tailed) is 0.396, and the exact significance is 0.419. These p-values indicate no significant difference in information literacy skills between male and female students. Similarly, for technology operation and concepts, the Mann-Whitney U value is 124.000, Wilcoxon W is 559.000, and Z is -1.111, with a two-tailed significance of 0.266 and an exact significance of 0.294. Again, these values suggest no significant difference between genders in this skill area.

Regarding communication and collaboration, the Mann-Whitney U value is 148.000, with a Wilcoxon W value of 583.000 and a Z-score of -0.361. The asymptotic significance is 0.718, and the exact significance is 0.743, indicating no significant difference between male and female students. For problem-solving and critical thinking, the Mann-Whitney U value is 128.000, Wilcoxon W is 563.000, and Z is -0.986, with a two-tailed significance of 0.324 and an exact significance of 0.353. These results show no significant gender difference in problem-solving and critical-thinking skills. Lastly, in the safety and security category, the Mann-Whitney U value is 149.000, Wilcoxon W is

584.000, and Z is -0.330, with an asymptotic significance of 0.741 and an exact significance of 0.765. These p-values indicate no significant difference in safety and security skills between male and female students. Overall, the statistical analysis reveals no significant gender-based differences in digital literacy skills among students. These findings suggest that both male and female students possess comparable levels of digital literacy across all examined categories. Moving forward, educational strategies should continue to focus on enhancing digital literacy for all students without gender-specific modifications. Nevertheless, qualitative research could provide further insights into individual challenges and help tailor support. Ensuring a balanced curriculum that addresses the needs of all students is essential for fostering an inclusive learning environment and equitable skill development.

CONCLUSIONS AND RECOMMENDATIONS

The analysis of digital literacy skills among B.Ed. (Natural Sciences) students at OUSL indicates a generally moderate to high level of proficiency across various skill areas. Students exhibit the highest proficiency in safety and security, while communication and collaboration skills appear to be relatively weaker. Despite these differences, there is notable variability in scores, particularly in problem-solving and critical thinking, suggesting diverse abilities among students. The Mann-Whitney U test results reveal no significant gender-based differences in digital literacy skills across all examined categories, indicating that both male and female students possess comparable levels of digital literacy. These findings underscore the importance of enhancing digital literacy education for all students without gender-specific modifications while also highlighting the potential value of qualitative research to further understand individual challenges and tailor support accordingly. Ensuring a balanced and inclusive curriculum is essential for fostering equitable skill development and preparing students for the demands of the digital age.

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