

# The nexus between teacher trainees' digital literacy and online learning motivation

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## Abstract

**Purpose** – This study examined the relationship between levels of digital literacy and the online learning motivation (OLM) of teacher trainees across various factors.

**Design/methodology/approach** – This investigation utilized a quantitative research approach. The sample was selected through a purposive method and consisted of 485 teacher trainees from the School of Education at Bangladesh Open University (BOU). Participants' digital literacy and OLM were assessed using validated five-point Likert scale questionnaires, consisting of 17 items for digital literacy and six items for OLM. The collection of data was conducted via a cross-sectional survey. Descriptive analysis, Cronbach's alpha, exploratory factor analysis, *t*-test and ANOVA were employed for the purpose of data analysis.

**Findings** – The findings demonstrated that teacher trainees possessed sufficient digital literacy and OLM concerning the specified variables. Furthermore, there was a significant correlation between digital literacy and OLM. BOU can evaluate all of these findings to make a rational decision regarding the development of its teacher education programs.

**Originality/value** – This exploratory study has yielded significant insights into the demographic characteristics, computer and internet skills, virtual learning skills and OLM of teacher trainees, thereby enhancing the existing body of knowledge in this field.

**Keywords** Digital literacy, Online learning motivation, Teacher trainees, Bangladesh Open University

**Paper type** Research paper

## 1. Introduction

Technological advancements and the explosion of information have transformed the landscape of learning (Akour and Alenezi, 2022). The strategic implementation of technology has the potential to revolutionize the educational environment within a higher education institution, creating a framework that is supported by technological advancements (Ahmed and Opoku, 2022). Consequently, the integration of educational technologies is increasingly essential in the realm of education. Nonetheless, Sanchez and Alemán (2011) contended that the effective integration of technology in education necessitates the active involvement of organizational administration, students and



educators. Consequently, the current teaching–learning process significantly depends on the digital literacy of learners (Marín and Castaneda, 2023). For instance, the utilization of computers equipped with high-speed internet connections and various digitization media has enhanced the collaborative capabilities of learners (Ben Youssef *et al.*, 2022). Consequently, obtaining digital literacy is essential for teacher trainees. As a result, the importance of digital literacy for teacher trainees significantly contributes to the advancement of technology-supported education.

The Bangladesh Open University (BOU), the only public university in Bangladesh dedicated to open and distance learning, encounters the significant challenge of delivering educational opportunities to numerous disadvantaged individuals across the nation. A considerable number of graduates across various disciplines have already emerged from it. This program stands out as one of the most comprehensive teacher education initiatives offered by universities in Bangladesh. Since its inception, it has been engaged in the education of teachers in Bangladesh. The instructional delivery utilizes a conventional distance learning approach, marked by the absence of technology-driven elements, including the use of a learning management system. Nonetheless, the integration of technology is becoming more prevalent across various distance education institutions globally (Ahmed *et al.*, 2022a, b). Therefore, considering the global technological shift, BOU must adapt its curriculum to align with international standards by adopting technology-driven, entirely online or blended learning programs that successfully integrate in-person and online activities. However, starting any technology-driven educational approach necessitates a digital learning environment that fosters motivated online learners and employs skilled personnel. This study aims to determine the relationship between digital literacy and Online Learning Motivation (OLM) among BOU teacher trainees while also exploring the feasibility of implementing online programs by pinpointing essential areas for intervention. To achieve the outlined objectives, the following research questions and hypotheses have been formulated:

- (1) What was the existing level of the teacher trainees' digital literacy?
- (2) What was the existing level of the teacher trainees' OLM?
- (3) Was there any difference in teacher trainees' digital literacy and OLM levels in terms of their sex, location, job experience, educational qualification and teaching subject?
- (4) What was the relation between teacher trainees' digital literacy and OLM?

Research hypotheses (RH):

Null (H<sub>0</sub>): There is no significant relationship between digital literacy and OLM.

Alternative (H<sub>1</sub>): There is a significant relationship between digital literacy and OLM.

The primary objective of this study was to evaluate the digital literacy and OLM levels of BOU teacher trainees. The digital literacy levels were subsequently analyzed based on factors such as sex, location, highest educational degrees, teaching subjects and job experience. The insights related to these aspects were crucial for the implementation of a technology-driven teacher education program. Nevertheless, investigations in this domain were fragmented. For example, Shadat *et al.* (2020) examined the extent of digital literacy within rural households in Bangladesh. Akther (2018) proposed methods to enhance digital literacy among rural people in Bangladesh. Nahid *et al.* (2022) conducted an investigation into the digital literacy levels of BBA students in Bangladesh. Podder and Riad (2020) conducted an analysis of the secondary teacher education curriculum in Bangladesh, emphasizing the importance of digital literacy. Nonetheless, there is a significant lack of empirical studies focusing on digital literacy and OLM, particularly concerning teacher trainees at BOU. This study is crucial for stakeholders to meticulously plan and develop a technology-enhanced education program for teacher trainees. This article presents an empirical cross-sectional survey conducted through a quantitative approach.

## 2. Factors influencing digital literacy

[Marín and Castaneda \(2023\)](#) emphasized the importance of digital literacy for everyday life and educational pursuits. With the advancement of technology, especially the proliferation of web technologies, internet connectivity, and digital media among the “Net Generation,” the concept of “digital literacy” has also undergone significant changes. A broader framework is necessary to accurately describe the increasing use of digital literacy. Therefore, “digital literacy” refers to the capacity to organize, implement and assess real-world scenarios, which requires the acquisition and application of knowledge, skills, attitudes and personal traits. Moreover, creative endeavors hold considerable importance for digital literacy. The European Commission characterized digital literacy as the ability to apply technological knowledge for the purposes of innovation and entrepreneurship. This also entails gaining the knowledge and skills necessary for thriving in the 21st century ([Martin and Grudziecki, 2006](#)). Following the emergence of digital platforms, [Mohammadyari and Singh \(2015\)](#) contended that digital literacy includes the capacity to locate, organize, understand, evaluate and analyze information through digital platforms. In conclusion, digital literacy involves a range of skills, such as embracing new technologies with an open mind, understanding how to ethically locate and utilize digital information, creating and sharing new content and critically assessing existing information with effectiveness. In the digital age, literacy serves not as a substitute but as an essential complement, playing a vital role in achieving success across various domains, including the workplace, educational settings and social interactions ([Imjai et al., 2024](#)).

Digital literacy serves as the foundation for obtaining digital information, with proficiency in computers and internet usage being the two essential components of this skill set. Moreover, the existing literature suggests that the rapid and continuous growth of the virtual ecosystem requires individuals to possess the necessary skills and competencies in virtual technologies to perform tasks and tackle challenges in digital environments ([Spante et al., 2018](#); [Marin and Castaneda, 2023](#)). As a result, educational institutions around the world prioritize initiatives aimed at improving their students’ digital literacy by developing competencies in computer usage and internet navigation. In this context, various studies indicate that factors such as sex, grade level, age and socioeconomic status significantly influence learners’ digital literacy levels ([Nasah et al., 2010](#)). Given BOU’s intention to implement a technology-supported teacher education program, it is crucial to investigate the digital literacy levels of teacher trainees in relation to their sex, educational backgrounds and experiences. Nonetheless, the thorough examination of the existing literature indicates that there have been few studies carried out in Bangladesh regarding these matters ([Akther, 2018](#); [Nahid et al., 2022](#)). Therefore, an effort is made to fill this gap in the present study.

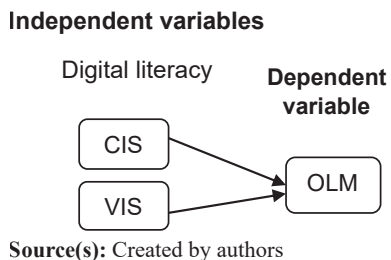
Conversely, motivation, especially in the context of online learning, is crucial for developing computer and internet skills (CIS), which in turn affects digital literacy ([Cigdem and Ozturk, 2016](#); [Hung et al., 2010](#); [Tang and Chaw, 2016](#)). The influence of motivation on learners encompasses their approach to learning, the material they engage with and the duration of their learning sessions ([Özhan and Kocadere, 2020](#)). This concept is fundamental in educational settings, as it illustrates the degree to which students engage in mastering particular tasks ([Schweder and Raufelder, 2024](#)). Therefore, the motivation of students plays a crucial role in their learning processes. This serves as the driving force that motivates individuals to acquire knowledge and engage in educational endeavors. Throughout the COVID-19 pandemic, motivation has been identified as a crucial element in online learning ([Sultana et al., 2023](#)). The motivation of students tends to be elevated in online environments, as they possess greater autonomy over their educational journey compared to traditional classroom settings. As a result, in online learning environments, the motivation of learners plays a crucial role in achieving successful completion ([Chen and Jang, 2010](#)). [Kim and Frick \(2011\)](#) posited that learners in online courses might encounter technological challenges and disruptions in communication. The presence of these frustrating technical issues prevents the student from engaging with the course materials, activities, tasks, instructor or fellow students.

Students tend to become disengaged from their learning and may even discontinue an online course when faced with technological challenges. When technical issues are absent, students exhibit a strong motivation to engage in online learning. Consequently, a certain level of technological understanding is necessary for participating in online education. This skill is crucial for minimizing cognitive load, which can shift a student's focus away from the course material to technological challenges, ultimately decreasing their motivation to engage in learning (Kim and Frick, 2011; Sultana *et al.*, 2023). A study conducted by Sultana *et al.* (2023) revealed that students' confidence in their CIS plays a crucial role in their success in online courses. Consequently, it is crucial to carefully evaluate various elements, such as the structure of learning activities and the digital tools utilized, to enhance student engagement in online learning.

A study conducted by Karakiş (2022) revealed that gender does not have an impact on digital literacy levels. However, a significant disparity in motivation for online learning was identified between female and male learners. Furthermore, the total score on the OLM scale shows considerable differences across various participant groups; a positive and significant relationship is observed between OLM and digital literacy. In a similar vein, Suswandari *et al.* (2022) found a significant correlation between digital literacy and the motivation of learners to engage in learning. In relation to Bangladesh, there exist several studies focused on information and communication technology (ICT) and teacher education. Nonetheless, the majority of the investigations focused on the incorporation of ICT within teacher education (Islam *et al.*, 2023; Cross *et al.*, 2022). A fairly small number of studies have been carried out regarding the professional development of educators and their digital literacy (Khalid *et al.*, 2015). Nonetheless, there is a significant lack of investigation into the digital literacy levels and OLM among teacher trainees in Bangladesh, specifically focusing on those enrolled at BOU. As a result, this investigation plays a vital role in filling the gap in the existing literature.

### 2.1 Conceptual framework

This study reviewed the works of Tang and Chaw (2016) and Subramaniam *et al.* (2019) to develop its conceptual framework. Subramaniam *et al.* (2019) examined technical competency, self-efficiency, social competency, self-directedness and communication competency as independent variables influencing the dependent variable of massive open online course readiness. Tang and Chaw (2016) evaluated underpinning, experiential learning and searching as independent variables influencing the dependent variable of effective learning. This study identified two crucial elements of digital literacy – CIS and VLS – as independent variables, with OLM serving as the dependent variable. The customized primary variables were established in accordance with the educational setting of the BOU teacher trainees (Ahmed *et al.*, 2022a, b, 2024). Figure 1 illustrates the conceptual framework of this study.



**Figure 1.** Conceptual framework of the study

### 3. Methodology

This investigation utilized a quantitative approach aligned with the formulated research questions and hypotheses (Creswell, 2012). As a result, a cross-sectional survey was employed to collect quantitative data. Descriptive analysis, Cronbach's alpha, exploratory factor analysis (EFA), the *t*-test and ANOVA were employed to investigate and interpret the conditions related to digital literacy and OLM among the teacher trainees of BOU.

#### 3.1 Population, sampling procedure and samples

The participants in this study consisted of teacher trainees from various regions of the country, including the main campus of BOU located in Gazipur. The population of the study included around 7,000 individuals undergoing teacher training. Purposive sampling was utilized to choose the sample from the population. Data were collected from 485 teacher trainees based on the criteria set forth by Krejcie and Morgan (1970), indicating that a sample size of 370 is adequate for a population of 10,000. Approximately 7,000 individuals were enrolled as teacher trainees. Consequently, the data collected from 485 trainees was considered adequate.

#### 3.2 Data collection instruments and process

A survey questionnaire was used to collect data, formulated based on the research conducted by Çam and Kiyici (2017), Cigdem and Ozturk (2016), Hung *et al.* (2010) and Tang and Chaw (2016). The research was carried out at BOU, which included many study centers. Eight faculty members from BOU were assigned to gather data from various research centers throughout different administrative divisions of the nation. The researchers conducted a data collection orientation for the faculty members participating in the data-collecting process. A printed survey questionnaire was disseminated to teacher trainees at each research location to improve convenience and augment engagement among trainees. All participating teacher trainees expressed voluntary consent to participate in this research. Confidentiality was guaranteed during the data collection process and upon its completion. Participation in the research was completely voluntary, and all participants were informed of their freedom to withdraw at any moment. Furthermore, measures were taken to ensure the anonymity of the study participants.

### 4. Findings

#### 4.1 Demographic profiles of the respondents

Among the total 458 respondents, 314 (64.7%) respondents were male and 171 (35.3%) were female. About 189 (39%) were urban respondents and 296 (61%) were rural. Most respondents work in rural areas because the rural-level teacher trainees are the prime recipients of BOU's open and distance education programs. Also, BOU's mission is to provide a learning opportunity for people with disadvantaged positions residing in rural areas to continue their studies. About 362 (74.6%) of respondents had a master's degree, whereas 35 (7.2%) hold three-year bachelor's degrees and 88 (18.1%) hold four-year bachelor's degrees. The teaching subject of 261 (53.8%) teacher trainees was humanities, 166 (34.2%) was science and 58 (12.0%) was business. Most of the respondents, 277 (57.1%), had 1–5 years of job experience. 118 (24.3%) had 6–10 years, 41 (8.5%) had 11–15 years and 49 (10.1%) had over 16 years of job experience.

#### 4.2 Exploratory factor analysis (EFA)

The construct validity of the scale was measured by EFA (Çam and Kiyici, 2017). Thereby, principal axis factoring (PAF) with Promax rotation was used to examine the underlying structure of the scale. PAF is an estimation method in EFA and can recover weak factors (De Winter and Dodou, 2012). The initial analysis of the *R*-matrix revealed that a significant number of coefficients exceeded 0.30. The Kaiser-Meyer-Olkin (KMO) index was 0.95.

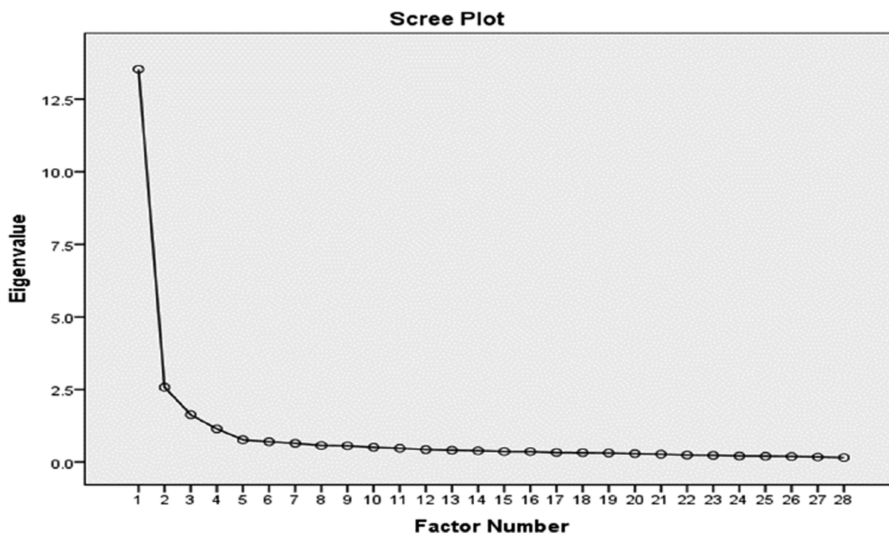
According to Kaiser (1970), 0.6 is its suggested value. Bartlett's test of sphericity attained statistical significance ( $\chi^2 = 10,146.60, p < 0.001$ ) (Bartlett, 1954), indicating that data were suitable for factor analysis. The preliminary analysis identified four components with eigenvalues over 1, explaining 48.32, 9.20, 5.83 and 4.08% of the variance, respectively. Nonetheless, the scree plot indicates the possibility of a three-factor solution for the scale (Figure 2). Of the 30 items, 23 were retained for the final scale with three factors, as per the best practices of item retention outlined at the outset. About eight items (numbers 1–8) loaded on factor one named CIS, nine items (numbers 12, 14, 15, 16, 18, 19, 20, 22 and 24) loaded on factor two named virtual learning skills (VLS) and six items (numbers 25–30) loaded on factor three named OLM (Table 1).

#### 4.3 Normality and validity

In addition to EFA, skewness, kurtosis and Cronbach's alpha were calculated to confirm the normality and internal consistency of the data sets. The constructs were normally distributed (Table 2). This is because, in accordance with Kline (2005), absolute scores of skewness under 3 and kurtosis under 10 will be considered acceptable values. The acceptable internal consistency reliability of each factor was found by calculating Cronbach's alpha value, i.e. CIS (0.0.937), VLS (0.911) and OLM (0.861). Blunch (2008) argued that a value greater than 0.7 is considered acceptable, while a value greater than 0.9 is considered excellent.

#### 4.4 Findings on digital literacy level of the teacher trainees

The acquisition of the digital literacy level of the respondents was assessed against 23 statements developed focusing on CIS and VLS in the items of inquiry (Table 1). A five-point Likert scale was employed to assess respondents' CIS and VLS. The mean of each statement was used to determine the level of literacy in each item. For each item, the respondent was expected to achieve a mean literacy score of 5 for the highest and 1 for the lowest. Therefore, the criterion mean, or cutting point, for determining the levels of (satisfactory/unsatisfactory) CIS and VLS skills of the respondents was the intermediate point (3) of these two scores. That



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Figure 2. The scree plots generated in EFA (28 items)

**Table 1.** Standardized factor loadings from the exploratory factor analysis

| Items                                                                 | CIS   | VLS   | OLM   | Mean         | SD    |
|-----------------------------------------------------------------------|-------|-------|-------|--------------|-------|
| 1. I have basic skills in operating a computer                        | 0.815 |       |       | 4.35         | 1.023 |
| 2. I can find out information from the internet                       | 0.689 |       |       | 4.20         | 1.165 |
| 3. I can send an email with attached files                            | 0.708 |       |       | 3.78         | 1.349 |
| 4. I can use a web browser (e.g. Firefox, Internet Explorer, etc.)    | 0.697 |       |       | 4.03         | 1.265 |
| 5. I am proficient in typing on the computer keyboard                 | 0.851 |       |       | 3.96         | 1.115 |
| 6. I have experience in using MS Word                                 | 0.949 |       |       | 3.99         | 1.187 |
| 7. I have experience using MS Excel                                   | 0.845 |       |       | 3.57         | 1.284 |
| 8. I have experience using MS PowerPoint                              | 0.824 |       |       | 3.62         | 1.326 |
|                                                                       |       |       |       | Total = 3.93 |       |
| 12. I can read on the computer screen                                 |       | 0.452 |       | 4.35         | 0.952 |
| 14. I can express my thinking through online writing                  |       | 0.631 |       | 3.76         | 1.100 |
| 15. I can learn online audio, video, picture and online discussion    |       | 0.683 |       | 4.30         | 0.987 |
| 16. I can continue a conversation with others through Skype           |       | 0.647 |       | 3.54         | 1.313 |
| 18. I can continue a conversation with others through messenger       |       | 0.783 |       | 4.15         | 1.195 |
| 19. I can take notes by watching online video                         |       | 0.940 |       | 4.03         | 1.128 |
| 20. By connecting with remote students online, I can make assignments |       | 0.837 |       | 3.76         | 1.201 |
| 22. I can work in an online group for my online course                |       | 0.799 |       | 3.66         | 1.161 |
| 24. I can continue online courses when the instructor is offline      |       | 0.436 |       | 3.40         | 1.208 |
|                                                                       |       |       |       | Total = 3.88 |       |
| 25. I consider myself self-motivated to pursue an online course       |       |       | 0.406 | 4.00         | 1.089 |
| 26. I should encourage others to take online courses                  |       |       | 0.823 | 4.31         | 0.851 |
| 27. I could complete an online course despite household distractions  |       |       | 0.627 | 3.96         | 1.035 |
| 28. I am capable of working autonomously for online courses           |       |       | 0.562 | 4.02         | 1.033 |
| 29. I believe quality education can be ensured by online course       |       |       | 0.770 | 4.34         | 0.817 |
| 30. I would be delighted to enroll in an online course                |       |       | 0.832 | 4.42         | 0.801 |
|                                                                       |       |       |       | Total = 4.17 |       |
| Source(s): Created by authors                                         |       |       |       |              |       |

**Table 2.** Normality and reliability test

| Items                         |     | Skewness | Kurtosis | Cronbach's alpha | N of items |
|-------------------------------|-----|----------|----------|------------------|------------|
| Digital literacy              | CIS | −0.860   | 0.058    | 0.937            | 8          |
|                               | VLS | −0.878   | 0.638    | 0.911            | 9          |
| OLM                           |     | −1.012   | 1.348    | 0.861            | 6          |
| Source(s): Created by authors |     |          |          |                  |            |

means the items that scored mean values higher than the cutting point (3) were considered satisfactory skills and vice versa.

Teacher trainees had overall satisfactory performance in all items of CIS. They opined to have a high level of skills in three items and moderate in five items of CIS. They had high skills in computer operation (Mean: 4.35), finding information from the internet (Mean: 4.20) and using different internet browsers (Mean: 4.03). However, they had comparatively moderate



skills in using MS Excel (Mean: 3.57). Their overall mean score for CIS skills was 3.93, which, according to the descriptive equivalent, falls at the bottom of the satisfactory level. On the other hand, teacher trainees also performed satisfactorily in all VLS items. They had a high level of skills in 4 items and moderate in five items of VLS. They had high skills in reading on the computer screen (Mean: 4.35), learning from different online media (Mean: 4.30), and being able to continue conversation with others through chat and messenger (Mean: 4.15). However, they had comparatively moderate skills in continuing online courses even though the instructor was not online at all times (Mean: 3.40). Their overall mean score for VLS skills was 3.88, which, according to the descriptive equivalent, falls at the bottom of the satisfactory level.

#### 4.5 OLM of the teacher trainees

The OLM was assessed based on ratings from six motivation items formulated using Likert's five-point scale. Table 1 indicates that the overall mean attitude score was 4.17, and all mean scores exceeded 3.00, indicating satisfactory positive motivation of the respondents toward online learning. Respondents demonstrated the highest motivation on the last item (Mean 4.42), indicating a strong desire to become an online learner. Nonetheless, the respondents expressed concern about home interruptions while learning online (Mean 3.96) and encountered challenges completing tasks due to these distractions. The OLM scores indicated that the teacher trainees were motivated to enroll in online courses, supported the introduction of online teacher education programs and exhibited confidence in their capacity to participate in the online course.

#### 4.6 Comparison of means according to background information with digital literacy and OLM

Shapiro–Wilk statistics were significant for all datasets (CIS, VLS and OLM). As a result, data failed to meet the assumption of normality. Therefore, the Kruskal–Wallis  $H$  test compared the means based on background information with digital literacy and OLM. Results are shown in Table 3. The results indicated a statistically significant difference in CIS scores between the two sex groups,  $\chi^2(2) = 26.622, p = 0.000$ , with a mean rank CIS score of 267.10 for males and 198.75 for females. The two location groups showed a statistically significant difference in CIS scores,  $\chi^2(2) = 2.221, p = 0.136$ , with a mean rank CIS score of 254.80 for urban and 235.46 for rural. The three educational qualification groups also showed a statistically significant variation in CIS scores,  $\chi^2(2) = 9.836, p = 0.007$ , with a mean rank CIS score of 202.09 for master's, 235.00 for bachelor's four years and 253.72 for bachelor's three years. However, no statistically significant difference was found in CIS score among the three teaching subject groups,  $\chi^2(2) = 4.793, p = 0.091$ , with a mean rank CIS score of 253.59 for science teachers, 230.77 for humanities teachers and 267.73 for the business studies teachers. There was a significant difference in CIS score among the four experience groups,  $\chi^2(2) = 10.494, p = 0.015$ , with a mean rank CIS score of 225.06 for the 1–5 years' experience group, 243.81 for the 6–10 years' experience group, 251.51 for the 10–15 years' experience group and 182.71 for the 16+ years' experience group.

A significant difference in VLS score was revealed between the two sex groups,  $\chi^2(2) = 4.700, p = 0.030$ , with a mean rank VLS score of 253.17 for males and 224.33 for females. There was a significant difference in VLS score between the two location groups,  $\chi^2(2) = 7.880, p = 0.005$ , with a mean rank VLS score of 265.33 for urban and 228.74 for rural. There was a significant difference in VLS score among the three educational qualification groups,  $\chi^2(2) = 12.578, p = 0.002$ , with a mean rank VLS score of 196.39 for master's, 235.04 for bachelor's four years, 255.10 for bachelor's three years. However, there was no significant difference in VLS score among the three teaching subject groups,  $\chi^2(2) = 1.161, p = 0.560$ , with a mean rank VLS score of 241.59 for science teachers, 239.80 for humanities teachers, 261.45 for business studies teachers. There was a significant



**Table 3.** Comparison of means according to background information with digital literacy and OLM

| Categories                |                   | CIS<br>Mean rank | df | $\chi^2(2)$ | <i>p</i> | VLS<br>Mean rank | df | $\chi^2(2)$ | <i>p</i> | OLM<br>Mean rank | df | $\chi^2(2)$ | <i>p</i> |
|---------------------------|-------------------|------------------|----|-------------|----------|------------------|----|-------------|----------|------------------|----|-------------|----------|
| Sex                       | Male              | 267.10           | 1  | 26.622      | 0.000    | 253.17           | 1  | 4.700       | 0.030    | 261.56           | 1  | 15.839      | 0.000    |
|                           | Female            | 198.75           |    |             |          | 224.33           |    |             |          | 208.93           |    |             |          |
| Location                  | Urban             | 254.80           | 1  | 2.221       | 0.136    | 265.33           | 1  | 7.880       | 0.005    | 246.14           | 1  | 0.157       | 0.691    |
|                           | Rural             | 235.46           |    |             |          | 228.74           |    |             |          | 241.00           |    |             |          |
| Educational qualification | Master's          | 202.09           | 2  | 9.836       | 0.007    | 196.39           | 2  | 12.578      | 0.002    | 224.44           | 2  | 1.940       | 0.379    |
|                           | 4-year Bachelor's | 235.00           |    |             |          | 235.04           |    |             |          | 243.47           |    |             |          |
|                           | 3-year Bachelor's | 253.00           |    |             |          | 255.10           |    |             |          | 247.47           |    |             |          |
| Teaching subjects         | Science           | 253.59           | 2  | 4.793       | 0.091    | 241.59           | 2  | 1.161       | 0.560    | 240.82           | 2  | 0.089       | 0.957    |
|                           | Humanities        | 230.77           |    |             |          | 239.80           |    |             |          | 244.74           |    |             |          |
|                           | Business          | 267.73           |    |             |          | 261.45           |    |             |          | 241.43           |    |             |          |
| Job experiences           | 1–5 years         | 225.06           | 3  | 10.494      | 0.015    | 265.02           | 3  | 24.543      | 0.000    | 247.91           | 3  | 1.948       | 0.583    |
|                           | 6–10 years        | 243.81           |    |             |          | 236.47           |    |             |          | 244.24           |    |             |          |
|                           | 11–15 years       | 251.51           |    |             |          | 202.40           |    |             |          | 234.91           |    |             |          |
|                           | 16+ years         | 182.71           |    |             |          | 168.22           |    |             |          | 219.02           |    |             |          |

**Source(s):** Created by authors

difference in VLS score among the four experience groups,  $\chi^2(2) = 24.543$ ,  $p = 0.000$ , with a mean rank VLS score of 265.02 for the 1–5 years' experience group, 236.47 for the 6–10 years' experience group, 202.40 for the 10–15 years' experience group, and 168.22 for the 16+ years' experience group.

A significant difference in OLM score was revealed between the two sex groups,  $\chi^2(2) = 15.839$ ,  $p = 0.000$ , with a mean rank OLM score of 261.56 for males and 208.93 for females. However, there was no statistically significant difference in OLM score between the two location groups,  $\chi^2(2) = 0.157$ ,  $p = 0.691$ , with a mean rank OLM score of 246.14 for urban and 241.00 for rural. Similarly, there was no statistically significant difference in OLM score among the four educational qualification groups,  $\chi^2(2) = 1.940$ ,  $p = 0.379$ , with a mean rank OLM score of 224.44 for master's, 243.47 for bachelor's four years and 247.47 for bachelor's three years. There was no statistically significant difference in OLM score among the three teaching subject groups,  $\chi^2(2) = 0.089$ ,  $p = 0.957$ , with a mean rank OLM score of 240.82 for science teachers, 244.74 for humanities teachers and 241.43 for business studies teachers. There was no statistically significant difference in OLM score among the four experience groups,  $\chi^2(2) = 1.948$ ,  $p = 0.583$ , with a mean rank OLM score of 247.91 for the 1–5 years' experience group, 244.24 for the 6–10 years' experience group, 234.91 for the 10–15 years' experience group and 219.02 for the 16+ years' experience group.

#### 4.7 Correlation

As Likert scale data were used to measure digital literacy and OLM, the Spearman correlation was used to test the hypothesis. Table 4 shows the correlations between the OLM and the components of digital literacy, i.e. CIS and VLS. Thereby, the hypothesis was accepted as the two components of digital literacy were significantly correlated with OLM. Among the results, CIS and VLS had a significantly high correlation ( $r = 0.698$ ), followed by VLS and OLM ( $r = 0.647$ ) and OLM and CIS ( $r = 0.487$ ).

### 5. Discussions

The investigation focused on four research questions aimed at uncovering fundamental details regarding (a) demographic characteristics, (b) CIS, (c) VLS and (d) OLM among the teacher trainees of BOU, with the goal of examining the relationship between digital literacy and OLM. The collection of data was conducted through a survey questionnaire. The quantitative analysis has explored critical aspects related to the implementation of technology-integrated teacher education programs by BOU as well as the relationship between digital literacy and OLM.

The quantitative analysis of demographic factors indicates that most of the teacher trainees possessed a master's degree. The majority of individuals participated in direct classroom teaching as assistant teachers, taking on the responsibility for delivering instruction within the classroom setting. The majority of individuals had job experience ranging from entry-level to mid-level positions. Most of them were located in rural regions.

**Table 4.** Correlation analysis – Spearman correlation matrix

|     | OLM     | Digital literacy<br>CIS | VLS |
|-----|---------|-------------------------|-----|
| CIS | 0.487** | 1                       |     |
| VLS | 0.647** | 0.698**                 | 1   |

**Note(s):** \*\*Correlation is significant at the 0.01 level (2-tailed)

**Source(s):** Created by authors

The data indicates that the teacher trainees demonstrated satisfactory levels of CIS as well as VLS. Teacher trainees demonstrated proficient computer operating skills, effective internet browsing abilities and strong online learning competencies, all of which are crucial for engaging in online education. While this exploration yields positive insights, certain aspects require enhancement to ensure the successful completion of any online course, such as proficiency in MS Office, effective online communication through email and participation in discussions on digital platforms. The findings indicate that the teacher trainees of BOU possess a certain level of preparedness to implement and embrace technology-supported courses. Nevertheless, it remains essential to enhance certain technological skills necessary for courses that utilize technology support. The empirical investigation conducted by [Ahmed et al. \(2022a, b\)](#) provides additional support for these findings, as their respondents were similarly secondary school teachers in Bangladesh. Given that numerous studies have logically demonstrated the influence of CIS on online learning readiness, BOU should take these elements into account prior to launching a technology-supported teacher education program ([James and Christian, 2016](#); [Subramaniam et al., 2019](#)).

The level of motivation serves as a dependable indicator of a person's mental state while participating in various educational initiatives, such as online learning. A range of factors, such as personal and professional requirements, knowledge and abilities, play a significant role in shaping it. The respondents demonstrated satisfactory digital literacy and conveyed a positive motivation for online learning. Teacher trainees exhibited a strong motivation for online learning due to the numerous advantages it offered them. For example, the challenges of engaging in regular in-person classes arise from a heavy workload, a lower economic status and substantial limitations in transportation caused by traffic congestion. Further investigation, including that of [Subramaniam et al. \(2019\)](#), indicated that broadening one's skill set serves as a key motivator for engaging in online learning. [James and Christian \(2016\)](#) highlighted the importance of motivation in this context. Their proposal emphasized the importance of addressing the motivation level of potential online learners, as the ability to continue and complete online or technology-integrated courses is significantly influenced by the learners' motivation. A strong level of motivation serves as a positive indicator of online learning effectiveness.

The comparison of means based on background information in relation to digital literacy indicated a notable difference across all factors, with the exception of teaching subjects, when comparing the two sub-factors of digital literacy: CIS and VLS. Nonetheless, the analysis of means based on background information in relation to OLM showed no significant differences across all background factors, with the exception of sex. Furthermore, the acceptance of the two hypotheses indicates a significant correlation between the components of digital literacy and OLM. [Subramanian et al. \(2019\)](#) found a significant correlation between self-efficacy, defined as the ability to learn skills online and preparation for online courses. [Subramanian et al. \(2019\)](#) discovered that there was no significant correlation between readiness for online learning and skills related to internet usage, computer operation or the motivation to participate in online courses. Nonetheless, numerous investigations have demonstrated that these three criteria play a crucial role in online learning ([Arnavut and Bicen, 2018](#); [Gameel and Wilkins, 2019](#)).

## 6. Implications

The study revealed the levels of digital literacy and OLM among teacher trainees. This understanding will serve as the basis for implementing online programs and shifting from conventional to digital learning approaches. The study further explored the significant correlation between digital literacy and OLM, considering various demographic factors. The results will aid in the development of the prerequisite course for online programs and the online program tailored for teacher trainees.

The findings indicate that the teacher trainees of BOU exhibited a positive attitude toward technology-supported learning. Their proficiency in computer and internet usage, along with

their virtual learning capabilities and motivation for online learning, were assessed to be at satisfactory levels. BOU is considering the introduction of technology-integrated teacher education programs aimed at improving its reputation and elevating the quality of education delivery to meet global standards. It is recommended that any online course delivery be postponed until the readiness of both staff and learners for online learning has been thoroughly assessed. This approach would facilitate a blended learning environment that integrates online and in-person, face-to-face instruction in a balanced manner.

## 7. Conclusion

The study has yielded significant insights regarding teacher trainees' demographic characteristics, proficiency in CIS, capabilities in virtual learning, and motivation for online learning. The results indicated that the teacher trainees were well-prepared for technology-enhanced course delivery. The CIS, VLS and OLM of teacher trainees were found to be at satisfactory levels for technology-supported teacher education programs. Furthermore, the statistical analysis revealed that there was a significant difference in digital literacy concerning the subjects being taught. Conversely, there was a significant difference in OLM based on sex. Furthermore, there is a significant correlation between the two components of digital literacy, namely CIS and VLS. The favorable attitude of teacher trainees toward technology-enhanced educational programs indicates that BOU might consider the implementation of these courses for its teacher trainees. BOU's policymakers aspire to pursue that direction. Similar investigations ought to be conducted in various fields at BOU to tackle the challenges and requirements of incorporating technology into educational delivery. For instance, research might be undertaken on additional pertinent variables by employing established models to evaluate the digital learning readiness of various learner groups.

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