

Digital Literacy Challenges Among Students at The Instituto Superior Dom Bosco, Timor-Leste

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Article History	Abstract
Received : 15 April 2026 Revised : 21 Juli 2026 Accepted : 10 Agustus 2026	<i>This study is an exploratory research project that aims to observe and measure the challenges of digital literacy among philosophy students at the Instituto Superior Dom Bosco in Timor-Leste. The measurement was conducted by examining five dimensions of digital literacy: access to and availability of digital infrastructure, technical skills, information literacy, communication and collaboration, and digital learning. The approach employed was a mixed-methods design that combines quantitative and qualitative studies through a survey administered to a sample of 31 students drawn from a population of 116. Quantitative data were analyzed descriptively and through correlation analysis, while qualitative data from open-ended questions provided contextual depth. The results indicate that the participants do not face serious challenges in terms of access, technical skills, and information literacy, with these three dimensions also showing strong positive correlations with one another. However, with regard to digital learning namely the use or application of digital tools in the academic process they experience considerable difficulties, pointing to pedagogical and motivational rather than purely technical barriers. The findings also show that communication and collaboration are two distinct dimensions that should be conceptualized and measured separately.</i> Keywords: Digital Literacy, Digital Learning, Information Literacy; Timor-Leste; Instituto Superior Dom Bosco

Abstrak

Studi ini merupakan penelitian eksploratif yang bertujuan untuk mengamati dan mengukur tantangan literasi digital di kalangan mahasiswa filsafat di Instituto Superior Dom Bosco, Timor-Leste. Pengukuran dilakukan dengan mengkaji lima dimensi literasi digital: akses dan ketersediaan infrastruktur digital, keterampilan teknis, literasi informasi, komunikasi dan kolaborasi, serta pembelajaran digital. Pendekatan yang digunakan adalah desain metode campuran yang menggabungkan studi kuantitatif dan kualitatif melalui survei terhadap sampel 31 mahasiswa dari populasi 116 mahasiswa. Data kuantitatif dianalisis secara deskriptif dan melalui analisis korelasi, sedangkan data kualitatif dari pertanyaan terbuka memberikan pemahaman kontekstual yang lebih mendalam. Hasil penelitian menunjukkan bahwa partisipan tidak menghadapi tantangan serius dalam hal akses, keterampilan teknis, dan literasi informasi, dengan ketiga dimensi tersebut juga menunjukkan korelasi positif yang kuat satu sama lain. Namun, terkait pembelajaran digital yaitu penggunaan atau penerapan alat digital dalam proses akademik mereka mengalami kesulitan yang cukup besar, yang mengindikasikan bahwa hambatan tersebut bersifat pedagogis dan motivasional, bukan sekadar teknis. Temuan ini juga menunjukkan bahwa komunikasi dan kolaborasi merupakan dua dimensi yang berbeda

dan sebaiknya dikonseptualisasikan serta diukur secara terpisah.

Kata Kunci: Literasi Digital; Pembelajaran Digital; Literasi Informasi; Timor-Leste; Instituto Superior Dom Bosco.

INTRODUCTION

After gaining independence in 2002 through the 1999 referendum—following more than four to five centuries of Portuguese colonization and 24 years under Indonesian occupation—Timor-Leste became the first nation to emerge at the dawn of the 21st century (Feijó, 2023; Fernandes, 2021; Saura, 2002)—marked by rapid advances in digital technology that have permeated various aspects of life, including education (Khahro & Javed, 2022; Ma & Ismail, 2025; Reddy et al., 2020). Since its inception, Timor-Leste has been directly confronted with the phenomenon of information digitization, which requires its people—particularly the younger generation—to adopt digital processes in both governance and daily life. In the context of higher education, digital literacy has become an essential competency that underpins the success of the learning process, access to information, and graduates' readiness to enter the workforce (Law et al., 2018). However, for developing and post-conflict countries such as Timor-Leste, this adoption process does not always proceed smoothly; limitations in information and communication technology (ICT) infrastructure and digital divides between regions often serve as major obstacles (Van Dijk, 2020). Concerns regarding the extent to which Timor-Leste's youth are able to use digital technology to access information critically and meaningfully served as the starting point for this study.

This study specifically observes and measures the digital literacy challenges faced by Philosophy students at the Instituto Superior Dom Bosco (ISDB) in Timor-Leste. Of the more than 18 universities and higher education institutions in the country—most of which are privately owned, with the Universidade Nacional de Timor Lorosa'e (UNTL) being the only public university—Instituto Superior Dom Bosco (ISDB) was selected due to its unique characteristics as a private higher education institution owned and managed by Catholic priests from the Salesian congregation. When it was founded in 2012, the Instituto Superior Dom Bosco (ISDB) had only one faculty—the Faculty of Philosophy, offering a programs in Social Philosophy, and was formerly known as the Instituto Filosófico de São Francisco de Sales; with the establishment of the Faculty of Education in 2024, the institution was renamed (ISDB (Instituto Superior Dom Bosco), n.d.). As a small private higher education institution operating within the context of these national digital infrastructure limitations, Instituto Superior Dom Bosco (ISDB) likely faces similar challenges in providing access to and technological support for its students—a situation that serves as an early indication of the need for in-depth research on digital literacy at this institution (King et al., 2019; Ndibalema, 2025; Sujiono et al., 2024).

In the higher education sector of Timor-Leste, particularly among students at the

Instituto Superior Dom Bosco (ISDB), the implementation of digital literacy focuses on students' ability to utilize communication technologies, web-based search engines, e-learning platforms, and academic software to support research and philosophical studies (Hei, 2024). Although the integration of Web 1.0 and Web 2.0 technologies—such as email and search engines—has begun to minimize distance barriers and expand access to instructional materials in higher education institutions in Timor-Leste, their implementation still faces a complex pedagogical transition (Hei, 2024; UNESCO, 2023). For philosophy students at Instituto Superior Dom Bosco (ISDB), digital literacy is no longer limited to the operational mastery of hardware and software (basic ICT skills), but encompasses the ability to transform these digital tools into means for analytical reflection, critical evaluation of information sources, and meaningful academic collaboration (Hei, 2024; UNESCO, 2023). Therefore, a comprehensive understanding of the realities of implementation and the challenges of digital literacy among Instituto Superior Dom Bosco (ISDB) students is crucial for formulating adaptive higher education learning strategies in the digital age.

In the context of Timor-Leste, research on digital literacy remains very limited. The only directly relevant study is (Siki, 2022), “Digital Literacy Levels Among Adolescents in Timor-Leste,” which measured the digital literacy levels of adolescents aged 17–24 through a survey using ten digital literacy competencies from JAPELIDI (Digital Literacy Activists Network), and found that the digital literacy levels of Timor-Leste adolescents were at Level 4, or above average. Siki's study itself builds upon several previous studies that did not directly analyze the digital literacy of students in Timor-Leste but rather examined specific aspects related to digital literacy. A study by (Lopes et al., 2017) identified efforts to integrate ICT into learning in Timor-Leste that had not yet achieved optimal results, while (Pinto, 2017) found that the use of ICT in virtual learning at the Faculty of Informatics, National University of Timor-Leste, remained very limited. Both of these studies were conducted before the COVID-19 pandemic, and to date, no follow-up research has been available to evaluate the development of digital literacy in Timor-Leste post-pandemic. In addition to this substantive gap, all previous research—including the study (Siki, 2022)—was purely quantitative, designed to measure digital literacy levels without exploring the underlying factors contributing to those levels or how students experience and interpret these challenges in their daily practices. These substantive and methodological gaps form the primary basis for this study.

To comprehensively address these gaps, this study employs a mixed-methods approach. The quantitative component is used to measure the extent of the digital literacy challenges faced by Instituto Superior Dom Bosco (ISDB) Philosophy students across the five dimensions outlined above, while the qualitative component is used to explore why and how these challenges arise—including students' experiences, concrete obstacles, and adaptation strategies in their academic lives. The combination of these two approaches allows the study to obtain a more comprehensive picture than if only one approach were

used, while also serving as a methodological contribution to digital literacy research in Timor-Leste, which has so far been dominated by quantitative approaches.

Based on this explanation, this study formulates two complementary research questions. First, quantitatively: What is the level of digital literacy challenges faced by Instituto Superior Dom Bosco (ISDB) Philosophy students in the dimensions of digital access and connectivity, digital skills, information literacy, communication and collaboration, and digital learning? Second, qualitatively: What factors underlie these challenges, and how do students experience and cope with them in their daily academic practices?

Based on these two questions, this study generally aims to comprehensively observe and analyze digital literacy challenges among Instituto Superior Dom Bosco (ISDB) students. Specifically, this study aims to (1) measure the level of digital literacy challenges faced by Instituto Superior Dom Bosco (ISDB) Philosophy students across the five dimensions under study, and (2) explore the underlying factors and students' experiences in addressing these challenges in depth.

This study offers novelty and contributions in two aspects. Theoretically, it enriches the digital literacy literature by presenting empirical data from the context of a post-conflict developing country—a context that has received minimal attention—while also serving as one of the initial efforts to apply a mixed-methods design in digital literacy research in Timor-Leste, a field that has traditionally been dominated by quantitative approaches. Practically, the findings of this study are expected to serve as input for Instituto Superior Dom Bosco (ISDB) and similar higher education institutions in designing policies and programs to strengthen students' digital literacy, as well as to provide data to support the formulation of digital education policies by the Ministry of Education of Timor-Leste.

RESEARCH METHODOLOGY

This study adopted a mixed-methods approach to examine the level of digital literacy challenges faced by students, particularly philosophy students, at the Instituto Superior Dom Bosco (ISDB). Quantitative data were collected via a structured questionnaire, while qualitative data were obtained through open-ended questions designed to provide a more contextual understanding of these challenges (Jayachandran et al., 2023; Kalolo et al., 2024; Meechan, 2026; Oladokun et al., 2025; Rabu, 2024). The survey was conducted in English; however, respondents were permitted to answer the open-ended qualitative questions in Tetum or Portuguese. The researchers then translated these responses into English during the digital data processing stage.

The study population consisted of students enrolled in the Philosophy program at Instituto Superior Dom Bosco (ISDB). The institution also offers an educational program that was newly established in 2024 and currently has fewer than 20 students; therefore, this program was excluded from the study. From a total population of 116 students, a

sample of 90 participants was selected through random sampling, with the aim of providing equal opportunities for participation and reducing bias. The sample size was calculated using Cochran's formula (Ahmed, 2024; Naing et al., 2022). However, only 31 respondents returned the survey, and among them, 10 chose not to answer the qualitative questions (resulting in 21 respondents who provided qualitative feedback). Consequently, the response rate was 26.7%, and the margin of error, at a 95% confidence level, was $\pm 15\%$. Nevertheless, this sample size remains adequate for quantitative analysis and sufficient for an exploratory study.

Quantitative data were analyzed using SPSS version 30 to calculate descriptive statistics such as frequencies and percentages. Multiple-response analysis was used to analyze data that allowed for more than one response option (Betts et al., 2022; Mahieu et al., 2021). The questionnaire assessed five constructs related to digital literacy: access and availability, technical skills, information literacy, communication and collaboration, and learning challenges. Each construct consists of three to five items measured using a five-point Likert scale (1–5). The “communication and collaboration” construct, based on data analysis, showed low internal consistency, and one of its items yielded a negative score. Consequently, the negatively performing item was removed, and the two remaining items were analyzed separately.

Finally, due to the exploratory nature of this study, the sample size was limited, and several constructs with internal consistency values below the conventional threshold of 0.7 were retained. In this study, ethical standards were upheld by ensuring voluntary participation, obtaining informed consent, and maintaining respondent confidentiality.

RESEARCH RESULTS

The participants in this study were students from the Faculty of Philosophy at the Instituto Superior Dom Bosco (ISDB) in Timor-Leste. Based on the data, as presented in Table 1, the majority of respondents were male, totaling 29 students (93.5%), compared to only 2 female students (6.5%; the total number of female students in the Faculty of Philosophy is only two). The age distribution of the respondents was as follows: 18–20 years, 8 students (25.8%); 21–25 years, 19 students (61.3%); and 26–30 years, 4 students (12.9%). Most respondents were in their second year of study, totaling 11 students (35.5%), followed by first-year students with 9 respondents (29%), third-year students with 6 respondents (19.4%), and fourth-year students with 5 respondents (16.1%).

Table 1
Respondent Description

Variable	Category	n	%
Gender	Male	29	93.5
	Female	2	6.5
Age Group	18–20	8	25.8

	21–25	19	61.3
	26–30	4	12.9
Year of Study	Year 1	9	29
	Year 2	11	35.5
	Year 3	6	19.4
	Year 4	5	16.1

With regard to the use of digital devices (Table 2), 21 respondents (67.7%) reported using laptops to access the internet. In addition, 14 respondents (45.2%) used smartphones, 6 respondents (19.4%) used desktop computers, and 1 respondent (3.2%) reported not having any device to access the internet. As this item was formulated as a multiple-response question, respondents were allowed to select more than one option.

Table 2
Digital Devices Used to Access the Internet

Digital Devices	n	% of Respondents
Smartphone	14	45.2
Laptop	21	67.7
Desktop computer	6	19.4
None	1	3.2

All respondents, totaling 31 individuals (100%), accessed the internet through the campus internet infrastructure. Home internet access, as shown in Table 3, was reported by 9 respondents (29%), while access through public hotspots was reported by 2 respondents (6.5%). This item was also designed as a multiple-response question, allowing respondents to select more than one available option.

Table 3
Internet Access Options Used by Respondents

Internet Access Options	n	% of Respondents
On campus	31	100
At home	9	29
Public hotspots	2	6.5

The quantitative data were categorized into five groups: access and availability, technical skills, information literacy, communication and collaboration, and learning challenges. These five categories represent the dimensions of digital literacy challenges. Accordingly, examining these five elements provides an overview of the digital literacy challenges faced by students of the Faculty of Philosophy at Instituto Superior Dom Bosco (ISDB).

Table 4
Reliability Test

Construction	Number of Items	Cronbach's Alpha
Construction 1	4	0.726
Construct 2	4	0.832
Construction 3	4	0.591
Construction 4	3	0.429
Construction 5	5	0.462

The five categories constitute constructs whose levels of reliability were tested (the results are presented in Table 4). Descriptive analysis for Construct 1, "Access and Availability," yielded a Cronbach's alpha of 0.726, indicating acceptable internal consistency, particularly for an exploratory study. For Construct 2, "Technical Skills," the Cronbach's alpha was 0.832, reflecting good internal consistency. Construct 3, "Information Literacy," produced a Cronbach's alpha of 0.591, suggesting weaker internal consistency, categorized as moderate. However, given the small number of items (four items), the reliability, although below the standard threshold of 0.70, remains acceptable. Moreover, as the item-total correlation values ranged from 0.266 to 0.579, all items were retained.

Construct 4, "Communication and Collaboration," proved to be more problematic, as its Cronbach's alpha was 0.429, with one item ("I can participate in online discussions or learning platforms") exhibiting a negative inter-item correlation (-0.30). Consequently, this item was excluded, and the remaining two items (from an original total of three items) also yielded a negative alpha value. As a result, a composite score for this construct was not calculated. Instead, the two remaining items were analyzed and reported separately.

Construct 5, "Learning Challenges," yielded a Cronbach's alpha of 0.462, indicating low internal consistency. This condition reflects the multidimensional nature of "learning challenges," which encompass technical, motivational, and contextual factors. The items within this construct were retained due to the exploratory character of the study and the small sample size. Accordingly, the data were interpreted with caution and were triangulated with the qualitative findings.

The results of the descriptive analysis of the combined Constructs 1, 2, 3, and 5 are presented in Table 5. "Access and Availability" recorded a mean score (M) of 3.86, indicating that respondents generally agreed that they have adequate access to digital equipment for academic purposes, reliable and fast internet connectivity, the learning platforms used at Instituto Superior Dom Bosco (ISDB), and sufficient time to practice and improve their digital skills. The standard deviation (SD) of 0.54 suggests that participants' responses were relatively consistent.

Table 5
Descriptive Statistics of Digital Literacy Constructs

	N	Minimum	Maximum	Mean	Std. Deviation
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Access and availability	31	2.75	5.00	3.8629	.53556
Technical skills	31	2.75	5.00	3.8629	.53556
Information literacy	31	3.00	5.00	4.1613	.61424
Learning challenges	31	2.00	4.60	3.5806	.56179
Valid N (listwise)	31				

The mean score (M) for “Technical Skills” was 3.86, with a standard deviation (SD) of 0.54. This score indicates that participants’ perceptions of their technical skills for digital learning such as using word processors, presentation software, organizing files and folders on computers, and solving practical problems related to digital devices are high. Therefore, technical competence does not appear to constitute a major issue or barrier for most respondents.

“Information Literacy” represents the dimension that received an “approaching very high” rating, with a mean score of 4.16 and a standard deviation of 0.61. The respondents demonstrated a high level of confidence in their ability to search for information effectively on the internet, assess the credibility of information, use digital information effectively for learning purposes, and understand ethical principles in the digital domain.

The mean score for “Learning Challenges” was 3.58, with a standard deviation of 0.56. These data indicate that the level of learning challenges is high.

Meanwhile, due to low internal consistency, the two items of the “Communication and Collaboration” construct were analyzed separately. The descriptive statistics (Table 6) show that respondents’ responses to both statements (items) were “approaching very high.” Participants agreed that they are able to use email for academic communication (M = 4.19, SD = 0.54). Similarly, they reported a high perception of their ability to collaborate with classmates through the use of digital tools (M = 4.19, SD = 0.65).

Table 6

Descriptive Statistics of Communication and Collaboration Items

	N	Min	Max	Mean	Std. Deviation
I can use email for academic communication	31	3	5	4.19	.543
I can collaborate with classmates using digital tools	31	3	5	4.19	.654
Valid N (listwise)	31				

In summary, the descriptive statistics indicate that the respondents reported high mean scores in “Access and Availability” (M = 3.86, SD = 0.54), “Technical Skills” (M = 3.86, SD = 0.54), and “Learning Challenges” (M = 3.58, SD = 0.56). The dimension of “Information Literacy” approached a very high level, with a mean score of 4.16 and a standard deviation of 0.61. The high level of “Learning Challenges” suggests that respondents experience substantial difficulties in this area, particularly in the use of digital tools for learning purposes.

Subsequently, correlation analysis among the constructs using Pearson's correlation produced the following results (Table 7).

Table 7
Pearson Correlations

		Access & availability	Technical skills	Information literacy	Learning challenges	I can use email for academic communication	I can collaborate with classmates using digital tools
Access & availability	Pearson Correlation	1	1.000**	.525**	.456**	.238	.221
	Sig. (2-tailed)		<.001	.002	.010	.198	.232
	N	31	31	31	31	31	31
Technical skills	Pearson Correlation	1.000**	1	.525**	.456**	.238	.221
	Sig. (2-tailed)	<.001		.002	.010	.198	.232
	N	31	31	31	31	31	31
Information literacy	Pearson Correlation	.525**	.525**	1	.352	.053	.334
	Sig. (2-tailed)	.002	.002		.052	.776	.066
	N	31	31	31	31	31	31
Learning challenges	Pearson Correlation	.456**	.456**	.352	1	.209	.192
	Sig. (2-tailed)	.010	.010	.052		.258	.301
	N	31	31	31	31	31	31
I can use email for academic communication	Pearson Correlation	.238	.238	.053	.209	1	-.015
	Sig. (2-tailed)	.198	.198	.776	.258		.936
	N	31	31	31	31	31	31
I can collaborate	Pearson Correlation	.221	.221	.334	.192	-.015	1

with classmates using digital tools	Sig. (2- tailed)	.232	.232	.066	.301	.936	
	N	31	31	31	31	31	31

** . Correlation is significant at the 0.01 level (2-tailed).

The above data indicate positive and statistically significant correlations between “Access and Availability” and “Technical Skills” ($r = 1$, $p < 0.001$), between “Technical Skills” and “Information Literacy” ($r = 0.525$, $p = 0.002$), and between “Access and Availability” and “Information Literacy” ($r = 0.052$, $p = 0.002$). “Learning Challenges” show a moderate positive correlation; however, these relationships do not reach statistical significance with either “Technical Skills” ($r = 0.456$, $p = 0.10$) or “Access and Availability” ($r = 0.456$, $p = 0.10$). The correlation between “Learning Challenges” and “Information Literacy” is moderate and positive but does not reach statistical significance ($r = 0.35$, $p = 0.052$). Meanwhile, no significant correlations were found between the two items analyzed separately and any of the constructs, nor between the two items themselves.

DATA INTERPRETATION AND DISCUSSIONS

Data Interpretation

The primary objective of this study was to measure the digital literacy challenges faced by students in the Faculty of Philosophy at Instituto Superior Dom Bosco (ISDB), with a specific focus on challenges across five dimensions of digital literacy. The five dimensions studied were: (1) access to and availability of digital facilities and infrastructure for academic purposes; (2) technical skills in using basic digital tools; (3) information literacy, namely the critical ability to evaluate digital information; (4) digital communication and collaboration; and (5) digital learning challenges. The research results indicate that overall, respondents reported high levels of access, technical skills, information literacy, and digital communication and collaboration, while at the same time reporting high levels of perceived digital learning challenges. In other words, although barriers in other dimensions of digital literacy were relatively low, respondents faced significant challenges in the domain of digital learning. This general pattern is further reinforced by a more detailed interpretation of the data analysis results. The following section presents a more in-depth interpretation of the findings of this study.

Descriptive analysis shows that respondents scored high on the constructs of access, technical skills, and information literacy. Among these constructs, information literacy recorded the highest average score, approaching a very high level. This indicates that respondents have a strong perception of their ability to search for information, assess its credibility, use it for academic purposes, and understand the ethical implications of digital information. This trend is consistent with their identity as philosophy students,

who are trained to adopt a critical stance toward information, as well as with their status as members of the “digital generation” (Generation Z), since all respondents were born between 1997 and 2012. However, qualitative data analysis revealed that, in the domain of information literacy, some respondents reported difficulties in managing information, and that the abundance of information itself became a source of distraction for their academic studies. In other words, the phenomenon of information overload emerged as a challenge in the field of information literacy.

The constructs of “Access and Availability” of digital infrastructure and “Technical Skills” also recorded high average scores, indicating that respondents consider themselves to have strong access to digital devices and well-developed digital competencies. They generally consider themselves ready to engage in digital environments. However, findings from the qualitative data indicate that extremely slow internet speeds do not sufficiently support academic activities, and there is a need for training in the use of basic software or programs that could enhance their studies. These findings reflect the broader situation of internet services in Timor-Leste, which is characterized by very low speeds and high costs. This latter point may explain why all respondents reported accessing the internet on campus (Table 3). Thus, while there is readiness in terms of devices, infrastructure, and technical skills on the one hand, there remains a need for fast (and affordable) internet connectivity and training in software use on the other.

Although respondents showed very positive responses regarding access, technical skills, and information literacy, they also experienced difficulties with digital learning. Indeed, the “Learning Challenges” construct in the digital context reported a high mean score and a low standard deviation. This suggests that respondents have not yet fully developed the ability to effectively apply digital tools and infrastructure in the learning process. This phenomenon does not appear to be specific to philosophy students at Instituto Superior Dom Bosco (ISDB) alone. A study conducted by (Pinto, 2017) at the Faculty of Informatics of the National University of Timor-Leste reported similar findings. According to qualitative data, difficulties in adopting digital technology in the learning process appear to be related to stress associated with the use of digital platforms in an academic environment.

Correlation analysis confirmed the relationships among these constructs. There was a positive and statistically significant correlation among the three constructs—access and availability, technical skills, and information literacy—indicating a strong relationship among these elements of digital literacy. There is also a positive relationship between “Learning Challenges” and access as well as technical skills. This suggests that digital capabilities in terms of infrastructure and technical competencies do not always reduce difficulties or challenges in digital learning. Meanwhile, no significant correlation was found between “Learning Challenges” and information literacy.

Due to issues with internal consistency, the “Communication and Collaboration”

construct could not be treated as a single composite measure; therefore, its two items were analyzed separately. Descriptive analysis revealed a relationship between the items “academic communication via email” and “digital collaboration with classmates,” but no correlation was found between these items and other constructs, nor between the two items themselves. This suggests that these two competencies may function independently, without a systematic relationship to other elements of digital literacy.

Discussion

The findings of this study describe digital literacy as a complex phenomenon involving various dimensions and challenges. The following is a comprehensive discussion that integrates the main findings along with strategic recommendations for students and the Instituto Superior Dom Bosco (ISDB):

- a. Although respondents demonstrated high levels of digital literacy in terms of access, technical competence, and information literacy, they still experienced difficulties in digital learning. These findings confirm that high levels of access and technical readiness do not automatically reduce or eliminate challenges in the digital learning process. Furthermore, the strong correlation between access, technical skills, and information literacy suggests that these three dimensions tend to develop simultaneously—students with access are more likely to hone their technical skills and information literacy.
- b. The positive relationship between digital learning challenges and access and technical skills indicates that students who are digitally active are actually more vulnerable to complex digital activities and cognitive load. The high level of barriers in digital learning demonstrates that the problems faced by students are no longer purely technical or structural in nature but are rooted in pedagogical and motivational factors, such as stress and anxiety during academic activities on digital platforms. The lack of a correlation between information literacy and learning difficulties further underscores that students’ critical thinking skills do not necessarily alleviate the challenges they face in implementing digital-based learning.
- c. An analysis of communication and collaboration aspects complements the picture of the complexity of digital literacy among Instituto Superior Dom Bosco (ISDB) philosophy students. These two dimensions were analyzed separately due to internal consistency constraints; although both received high scores, no significant correlation was found between them or with other constructs. This indicates that academic communication via email and digital collaboration are two independent competencies with distinct characteristics; therefore, they must be conceptually and methodologically separated and measured using distinct instruments.

Overall, these findings underscore that addressing digital literacy challenges at Instituto Superior Dom Bosco (ISDB) can no longer rely solely on the provision of infrastructure but must instead focus on pedagogical improvements and systematic integration. To address digital literacy challenges at the Instituto Superior Dom Bosco

(ISDB), the institution is advised to transition toward the development of integrated digital pedagogy by offering specialized digital literacy classes or courses aligned with the tradition of critical thinking among philosophy students. In addition, Instituto Superior Dom Bosco (ISDB) needs to integrate digital platforms more systematically into the daily teaching and learning process, as well as provide adaptive support to alleviate students' digital anxiety and cognitive load.

CONCLUSION

This study aims to examine the level of digital literacy challenges faced by philosophy students at the Instituto Superior Dom Bosco (ISDB) in Timor-Leste by investigating five dimensions of digital literacy. These dimensions are: (1) access to and availability of digital infrastructure; (2) technical skills; (3) information literacy; (4) digital communication and collaboration; and (5) digital learning challenges. This study sought to measure the level of challenges across these five dimensions of digital literacy.

The results show that respondents reported high levels of perceived access, technical skills, and information literacy. This suggests that they do not face serious challenges in these three dimensions of digital literacy. However, in the domain of digital learning, they also reported high levels of perceived difficulty, indicating that they experience significant difficulties or barriers in applying digital technology to the learning process. This contrast suggests that digital learning involves not only technical competencies, critical thinking skills, and access to digital infrastructure, but also pedagogical and motivational factors.

This study also shows that digital communication and digital collaboration are two dimensions that must be conceptualized and measured separately. Overall, participants believe they do not face difficulties in terms of access to digital infrastructure, technical skills, or information literacy. However, they do face challenges in the area of digital learning. These findings reinforce the results of Siki's study, which found that the level of digital literacy among students in Timor-Leste is at Level 4, categorized as high.

To address these digital literacy challenges—particularly the obstacles encountered in the digital learning process—Instituto Superior Dom Bosco (ISDB) institutions are advised to take several comprehensive strategic steps. Instituto Superior Dom Bosco (ISDB) needs to transition from merely providing physical facilities to developing integrated digital pedagogy that aligns the use of technology with the tradition of critical thinking among philosophy students. In addition, institutions are advised to organize specialized digital literacy classes or training sessions and to integrate digital learning platforms more systematically and gradually into daily coursework. These steps should also be accompanied by adaptive psychopedagogical support to help students manage cognitive load and alleviate digital anxiety throughout the academic process.

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