Students' Digital Literacy Competence, Attitude, and Readiness Toward Technology-Integrated Learning

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Abstract. This study investigated the students' level of digital literacy competence, attitude, and readiness toward technology-integrated learning among Sciences and Mathematics Education students. The study utilized a descriptive correlational research design. A validated survey questionnaire was utilized in gathering data among the participants. Descriptive statistics was employed in determining students' levels of digital literacy, attitude and readiness toward technology-integrated learning. On the other hand, person r moment of correlation was used in determining significant relationships among the variables being investigated. Lastly, multiple regressions were utilized to determine variable that best predicts students' readiness toward technology-integrated learning. The results of the study revealed that the students obtained a high level of digital literacy competence, positive attitude and high level of readiness toward technology-integrated learning. Also, the study further shown that a positive, strong significant correlation exists between students' digital literacy competence and attitude on their readiness toward technology-integrated learning at 0.01level of significance thus, rejecting the null hypothesis of the study. Moreover, the study determined four (4) variables that best predict students' readiness namely: information literacy, intentional behavior, information and communication technology literacy, and cognition, which rejects the second hypothesis of the study. The study recommends that college professors may consider the variables that best predict students' readiness toward technology-integrated learning for meaningful learning outcome since these factors contributes to the mastery of the 21st century skills of the students.

Keywords: technology-integrated learning, digital literacy competence, attitude, readiness

1 Introduction

The art with which teachers administer their classes significantly impacts how their students learn. Because of this, it is becoming a trend in today's educational settings for teachers and educators to integrate and maximize the use of technology in the learning process. The learning process that uses technology is known as technology-integrated

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learning. Technology integration is the purposeful use of technology to pursue educational objectives [1]. It is an approach that centers students and encourages active participation throughout the process. When supported by today's technology, the learning process transforms into an interactive, engaging, and productive endeavor. The use of technology has improved students' engagement and willingness, and it has improved learning [2]. This has become relevant primarily since the students in the contemporary generation are used to being in an increasingly technologically advanced environment. Most students routinely engage in activities using various forms of technology. The use of technology in educational settings is something that many different areas of the world are interested in [3].

However, despite the numerous advantages can be gained by integrating technology into educational settings, there is a growing concern regarding how well students are coping in terms of their level of competence in digital literacy (e.g., information literacy, communication literacy, and media literacy). Also, this concern encompasses the attitude of students to integrate technology into their education and their readiness toward doing so as an integral part of their educational experience. Information literacy skills are variables to consider, for these are predictors of students' academic performance and writing skills [4]. On the other hand, student's attitudes significantly affect academic success in the learning process [5].

This implies that a desire to be digitally literate enough to participate in the learning process, a positive attitude, and the readiness for technology-integrated learning are essential for effective technology integration. Since technology is continuously and rapidly evolving, students need to demonstrate a willingness to adapt to new circumstances and ways of doing things for technology-integrated learning to be successful. Once the students develop and improve their media literacy skills, they can connect life and school [6].

Furthermore, technology is so powerful that it can expand learning significantly. Technology is a multifaceted instrument that aids learning. When students have seamless technology integration, they use technology regularly and have access to various tools suited for the work at hand. At the same time, students are given a chance to get a more in-depth understanding of the content [7]. Moreover, technology has a favorable influence on student learning [8]. Students are more engaged due to technology and frequently retain more material. That being said, technology is significant to students because it facilitates relevant learning opportunities. In addition, it allows students to collaborate with their classmates and learn from one another. When these elements are integrated, they positively influence student learning and motivation.

This study assessed students' digital literacy competence, attitude, and readiness toward technology-integrated learning. Moreover, the study aimed to determine if there is a significant relationship between digital literacy competence and attitude toward their readiness toward technology-integrated learning. Lastly, it determined which digital literacy competence and attitude variables best predict the students' readiness for technology-integrated learning.

2 Objectives of The Study

This study aimed to assess students' digital literacy competence, attitude, and readiness toward technology-integrated learning. Specifically, it aimed to determine the level of digital competence of students in terms of (a) Information and communication technology literacy, (b) Media literacy, and (c) Information literacy. Determined the level of attitude of the students toward technology integrated learning in terms of (a) Affection, (b) Intention behavior, and (c) Cognition. Determine the level of readiness of the students toward technology-integrated learning in terms of (a) Computer/internet self-efficacy, (b) Self-directed learning, (c) Learner control, (d) Motivation for learning, and (e) Communication efficacy. Find out significant relationship between digital literacy competence and attitude on their readiness toward technology integrated learning; and Determine which variable/s of the digital literacy competence and attitude best predict the readiness of the students toward technology-integrated learning.

3 Materials and Methods

The researchers utilized a descriptive correlational research design to assess the student's digital competence, attitude, and readiness toward technology-integrated learning. The participants were first-year Bachelor of Science in Education majors in sciences and mathematics at the College of Education. A total enumeration technique was employed in selecting the participants of the study. Hence, there were a total of 148 students participated in the study.

The study utilized three (3) validated questionnaires in gathering quantitative data, namely: Digital Literacy Competence toward Technology-Integrated Learning Survey Questionnaire [9], Attitude toward Technology-Integrated Learning Survey Questionnaire [10], and Readiness toward Technology-Integrated Learning Survey Questionnaire [11]. Descriptive statistics such as mean and standard deviation (SD) were used to determine students' level of digital literacy competence, attitude, and readiness toward technology-integrated learning. Also, the Pearson (r) moment correlation coefficient was used to determine a significant relationship between digital literacy competence and attitude on their readiness towards technology-integrated learning. Lastly, multiple regressions were employed to predict which digital literacy competence and attitude variables best predict the students' readiness toward technology-integrated learning.

Ethical considerations were properly observed in the entire conduct of the study. Informed consent was secured from the participants of the study before the actual data-gathering procedure. All data gathered were kept confidential and for research purposes only.

4 Results And Discussion

Table 1. Students' Digital Literacy Competence toward Technology-Integrated Learning

Dimensions	Mean	SD	Descriptive Rating	Qualitative Interpretation
Media Literacy	4.32	.637	Strongly Agree	Very High Competence
Information Literacy	4.17	.623	Agree	High Competence
Information and Communication Literacy	4.08	.617	Agree	High Competence
GRAND MEAN	4.19	.626	Agree	High Competence

Table 1 presents the students' digital literacy competence, having the overall mean score and standard deviation of 4.19 and .626, respectively. On the students' level of digital literacy competence toward technology-integrated learning as seen in the results, among the dimensions, media literacy has the highest representation, followed by information literacy, and lastly, information and communication literacy. It implies that students' digital literacy competence toward technology-integrated learning is vital since it encompasses their ability to identify, understand, access, and use the presented dimensions. The results of this variable are supported by the study where there is a positive response in the digital literacy ability of the students, and that media literacy competence shows the highest presentation [12]. In addition, students with high media literacy will increase their media quality [13]. With this, educators' and community leaders' roles are recognized in educating students on media literacy and helping students to find, analyse, evaluate, and synthesize enormous volumes of information [14.]

Table 2. Students' Attitude toward Technology-Integrated Learning

Dimensions	Mean	SD	Descriptive Rating	Qualitative Interpretation
Intentional Behavior	4.27	.612	Strongly Agree	Very Positive Attitude
Cognition	3.98	.725	Agree	Positive Attitude
Affection	3.91	.682	Agree	Positive Attitude
GRAND MEAN	4.05	.673	Agree	Positive Attitude

Table 2 depicts the students' attitude, having the overall mean score and standard deviation of 4.05 and .673, respectively, suggesting a "Positive Attitude." As gleaned from the table, among the dimensions, intentional behavior has the highest representation, followed by cognition and affection. It implies that students' attitude toward technology-integrated learning is a crucial element for the process to be effective since it encompasses the students' behavior. Integration of technology fosters positive attitudes toward student engagement, fulfillment, and academic success [15]. Students' attitudes

may change if technology is used successfully and effectively as a teaching tool [16]. Students learning outcomes are better if they show a favorable attitude toward their learning [17]. More importantly, when students understand the significance of things around them, they are more likely to develop positive attitudes toward learning [18].

Table 3. Students' Readiness toward Technology-Integrated Learning

Dimensions	Mean	SD	Descriptive Rating	Qualitative Interpretation
Motivation for Learning	4.31	.641	Strongly Agree	Very High Readiness
Computer/Internet Self-efficacy	3.90	.742	Agree	High Readiness
Communication Efficacy	3.81	.755	Agree	High Readiness
Self-directed Learning	3.80	.632	Agree	High Readiness
Learner Control	3.59	.623	Agree	High Readiness
GRAND MEAN	3.88	.678	Agree	High Readiness

Table 3 shows the level of students' readiness, having the overall mean score and standard deviation of 3.88 and .678, respectively, suggesting "High Readiness." As reflected in the results, motivation for learning has the highest representation, followed by computer/internet self-efficacy, communication efficacy, self-directed learning, and learner control. These results imply that students' readiness should be monitored when technology is integrated into the teaching and learning process, especially under the learners' control.

This is supported by the findings, which found that most students are technologically ready to utilize technology in their classroom [19]. Also, the research highlighted the students' readiness for e-learning, yet the study advised that the readiness could be increased in terms of study skills and technical abilities [20]. Further, students with more exposure to various learning technologies would have the critical computer skills required for success in a learning environment that integrates technology [21].

Table 4. Correlation between Students' Digital Literacy Competence and Attitude on Their Readiness toward Technology-Integrated Learning

Variables	Readiness	
	Pearson R-Value	Significance
Digital Literacy Competency	.750	.000**
Information and Communication Literacy	.676	.000**
Media Literacy	.664	.000**
Information Literacy	.716	.000**
Attitude	.717	.000**
Affection	.558	.000**
Intentional Behavior	.714	.000**
Cognition	.664	.000**
Readiness	1	

** significant at .05 level

Table 4 shows the correlation between students' digital literacy competence and attitude on their readiness toward technology-integrated learning. As depicted from the

table, the students' level of digital literacy competence shows a positive, strong relationship with their readiness toward technology-integrated learning at .750. According to these results, for students to be ready to use technology, they need to have a sufficient level of competence in the abilities associated with digital literacy. An increased level of digital literacy, in addition to technology literacy and human literacy of the students, will further improve their work readiness among the students [22].

The study's results further revealed that the student's level of attitude has a positive, strong relationship with their readiness toward technology-integrated learning at .717. The study's results imply a significant relationship between digital literacy competence and attitude toward their readiness toward technology-integrated learning. Thus, this study rejects the null hypothesis, which states, "There is no significant relationship between digital literacy competence and attitude on their readiness toward technology-integrated learning." This claim is supported by the fact that there is a correlation between learning readiness, attitude, and learning style and that each of these variables influences the efficient utilization of a virtual learning environment (VLE) [23]. Lastly, learners' attitudes toward integrating technology in learning would increase according to their readiness [24].

Table 5. Multiple Regression Analysis on Students' Digital Literacy Competence and Attitude on their Readiness toward Technology-Integrated Learning

Predictor Variables	Unstandardized Coefficients		Standard Coefficients	t	Sig
	β	Std Error	β		
(Constant)	.596	.211		2.826	.005**
Information Literacy	.232	.074	.265	3.139	.002**
Intentional Behavior	.232	.078	.260	2.973	.003**
Information and Communication Technology Literacy	.190	.069	.215	2.752	.007**
Cognition	.140	.060	.186	2.316	.022**

R-value = .803 R-squared value =.645 F-value=64.815 p-value =000**

Table 5 presents the stepwise multiple regressions on the dimensions under the independent variables: digital literacy competence and attitude. The four (4) variables that are found to be significant predictors of the dependent variable, readiness, are as follows: information literacy, intentional behavior, information and communication technology literacy, and cognition. All of these variables are significant at a 0.05 level of significance. The R-squared value of .645 indicates that 65% of the variation of readiness is explained by information literacy, intentional behavior, information and communication technology literacy, and cognition. It means that the other variables and some other factors explain the other 35%. Also, this analysis indicates a positive, very strong correlation, as indicated by the R-value, which is .803.

For this multiple regression analysis, the equation that is useful in predicting the students' readiness (Y) as indicated by the F-value (64.815) with its corresponding probability of .000, which is significant at $p<0.05$ follows:

$Y = .596 + .232(X1) + .232(X2) + .190(X3) + .140(X4);$

Where:

Y = Readiness

X1 = Information Literacy

X2 = Intentional Behavior

X3=Information and Communication Technology Literacy

X4 = Cognition

The results of the study imply that there are variables of digital literacy competence and attitude that can best predict students' readiness toward technology-integrated learning. Thus, this rejects the null hypothesis 2 of the study, which states, "There is/are no variable/s on the digital literacy competence and attitude that best predict the readiness of the students toward technology-integrated learning." Their views about hybrid learning significantly predicted the readiness of students for technology-integrated learning. It highlights how important it is to understand how students think about technology-integrated learning to adequately prepare them for blended learning (SANPANICH [25]. Moreover, information literacy is essential to students' readiness for technology-integrated learning [26].

5 Conclusions

Based on the analysis and interpretation of the study's results and findings, the following are the contributions of the study:

The students' digital literacy competence toward technology-integrated learning shows high competence. The students exhibit very high competence in media literacy, with high competence in information and communication technology literacy and information literacy.

The students' attitude toward technology-integrated learning shows a positive attitude. The students exhibit a very positive attitude regarding intentional behavior, whereas they have a positive attitude regarding affection and cognition.

The student's readiness toward technology-integrated learning shows high readiness. The students exhibit very high readiness in terms of motivation for learning, with high readiness in terms of computer/internet self-efficacy, self-directed learning, learner control, and communication efficacy.

There is a positive, significant correlation between digital literacy competence and attitude toward their readiness for technology-integrated learning. It is also true for all dimensions under digital literacy competence and attitude, which have shown a positive correlation with readiness. This rejects the study's null hypothesis, which states that "There is no significant relationship between digital literacy competence and attitude on their readiness toward technology-integrated learning."

The digital literacy competence and attitude variables that best predict the students' readiness toward technology-integrated learning are information literacy, intentional

behavior, information and communication technology literacy, and cognition. This rejects null hypothesis which states that "There is/are no variable/s on the digital literacy competence and attitude that best predict the readiness of the students toward technology-integrated learning."

The study recommends that future studies establish a technological profile of the students. It may also be possible to investigate whether or not there is a correlation between these demographic variables and the student's digital literacy competence, attitude, and readiness toward technology-integrated learning.

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