Short Paper

Integration of E-learning System through Mobile Technology

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Abstract

Purpose – This paper aims to identify the most commonly used E-learning resources in
the classroom among Elementary Education students in one of the Local University and
Colleges (LUCs) in Batangas, Philippines and evaluates the use of mobile technology and
E-Learning System in terms of functionality, usability, efficiency, and reliability based on
ISO 9126 evaluation standard.

Method – The researchers utilized a self-made questionnaire to gather necessary data to
evaluate the E-Learning system based on the ISO 9126 software quality metrics. The
questionnaires consisted of three parts: profile of the participants; E-Learning System and
E-Learning resources; evaluation of E-Learning System in terms of functionality, reliability,
usability, and efficiency. The participants were ninety-three students: nondisabled and
students with hearing and speaking problems.

Results – The most commonly used E-Learning resources in the classroom by the students were laptop computers, smartphones, mobile applications, internet, and video tutorials. It was found out that the E-learning system is highly functional, highly usable, highly efficient, and reliable through the use of mobile technology. This study also shows that there is no significant difference between the assessments of nondisabled students and students with disabilities using the E-Learning System. The participants stated that E-learning system increases the quality of learning because it integrates all forms of media.

Conclusion – Students and teachers were willing to embrace the E-Learning system, there is still a need of access other E-Learning resources, and ICT platforms. As depicted in the result of the study, since the computed values of all variables did not exceed the tabular value, the null hypotheses are hereby accepted. This implies that there is no significant difference between the assessments of nondisabled students and students with disabilities with regards to the E-Learning System.

Recommendations – Internet connectivity should be a priority to be established to benefit all the delivery models such as face-to-face, self-paced, and individualized learning along with virtual interactions. Integrating mobile learning may help overcome the concerns with connectivity and convenience to a great extent. Leveraging on the utilization of mobile phones, there should be regular capacity-building activities and skills enhancements on E-Learning System and other related software and tools among the professors, and students. E-learning designers may consider the existence of the users with hearing and speaking disabilities to develop an e-learning environment that may be effective to all users generally.

Practical Implications – Academic institutions would be able to adopt the same approach of using E-learning system though mobile technology to handle students with speaking and hearing problems in delivering teaching and learning.

Keywords – E-learning system, mobile technology, students with hearing and speaking problems, E-learning resources, ISO 9126

INTRODUCTION

E-Learning has been integrated in many academic institutions, shifting from the traditional way of education to an electronic environment where students can access and make use of information anywhere and at any convenient time. The education system in the Philippines has encountered issues and difficulties particularly in the deficiencies of instructional resources, and facilities. The rapid progress of information and communications technology brought significant changes in education that empowers

people to learn new ways and transform teaching and learning processes through E-learning.

E-Learning System is a software application for managing, documenting, tracking, reporting, and delivering electronic educational courses. Now that commercial and open-source E-Learning exists for both computers and mobile devices, it requires only a good E-Learning platform to promote education from virtually anywhere. Technology has changed so much that it fills the geographical divide with the use of resources, and makes the user feel like they are in an actual classroom. E-Learning provides the opportunity to distribute content in all forms of media such as videos, slideshows, word documents, and PDFs. As Encarnacion (2021) mentioned, E-learning could potentially shape the future of education by advancing the traditional classroom setting into the web.

According to Macwan (2017), mobile technology is evolving quickly. Mobile technology has enhanced its features from a basic phone call and texting to GPS navigation, internet searching, gaming, instant messaging applications, etc. Professionals agree with the trend that computer technology's future depends on wireless networking and mobile computing. Mobile technology is becoming increasingly prevalent through tablet and portable computers.

The rapid growth of mobile technology and the Internet has made it easier and quicker for users to access knowledge and information, including Persons with Disabilities (PWDs). However, as stated by Burgstahler (2014), PWDs continue to face challenges when it comes to accessing the full range of services available to disabled people. Barriers to basic computer applications explicitly restrict opportunities in education and jobs for certain people with disabilities. For example, part of a multimedia lesson using voice interpretation without subtitling or transcription is inaccessible to deaf students. Similarly, an instructional tutorial program involving the use of a mouse is inaccessible to a student who cannot use this device; and using an excessively complex software program may be inaccessible to persons with learning disabilities.

Currently, the design of mature software and websites has embedded the PWD-friendly culture. In the Philippines, various initiatives have been implemented like the Philippine Web Accessibility Group (2019) (PWAG) which has established web accessibility standards for PWDs to have a better access to IT resources particularly government websites. Even around the world, there is continuing enforcement and implementation of laws and issuances regarding IT resources accessibility standards for PWDs. Godoy (2020) mentioned that there are mobile applications that can be used as an aid in teaching Special Education (SPED).

The study introduces the use of E-Learning System using Schoology and mobile technology among nondisabled students and students with hearing and speaking problems taking up Bachelor of Elementary Education major in Special Education at Kolehiyo ng Lungsod ng Lipa - College of Teachers Education (KLL-CTE). Observation,

semi-structured interviews, researcher-made questionnaire, and software/technology evaluation instruments were used to determine the most commonly used E-learning resources by the students and to assess the use of Schoology and mobile technology, respectively.

The main purpose of the study was to assess the E-learning system through mobile technology among the Bachelor of Elementary Education major in Special Education students (nondisabled and students with hearing and speaking difficulties). Specifically, the study aimed to: identify the profile of the participants in terms of types of disability; determine the commonly used E-Learning resources in the classroom; assess how do the two groups of participants evaluate the E-Learning System through Mobile Technology using ISO 9126 software quality metrics in terms of functionality, reliability, usability, and efficiency; and assess if there is a significant difference between the assessments of the two groups of participants when they are grouped according to profile. For the research purpose, this study proposed a course of action that may be offered for the implementation of an E-learning system.
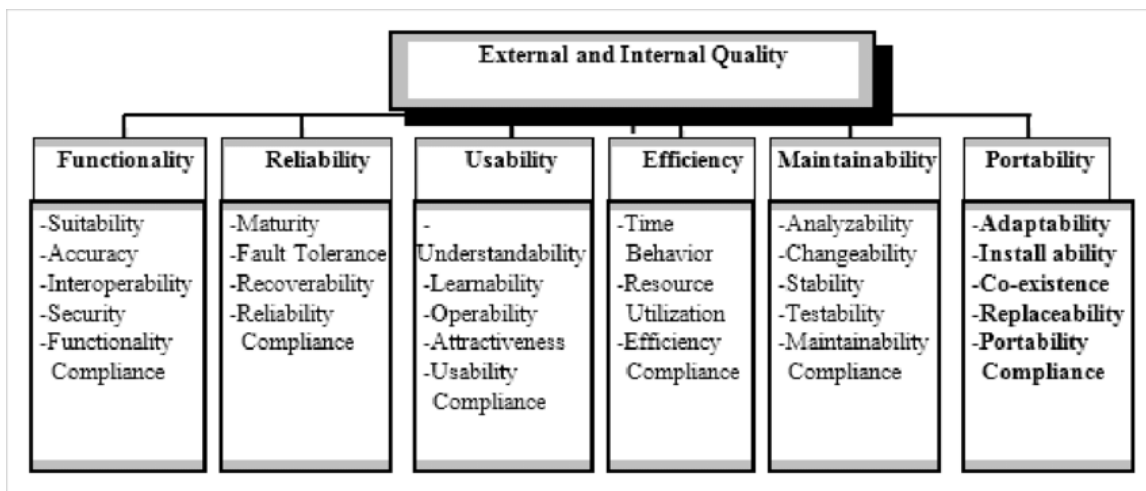

Figure 1. ISO 9126 Quality Model for External and Internal Quality

Figure 1 shows the ISO 9126 quality model and its characteristics and sub-characteristics. This model was used as a basis by the researchers to evaluate the E-learning system. ISO 9126 is an international standard for the evaluation of software. It presents three facets of software quality: internal quality, external quality and quality in use. The ISO 9126 software quality model identifies six main quality characteristics, namely: functionality, reliability, usability, efficiency, maintainability, and portability. Functionality is the essential purpose of any product or service. Reliability is a set of attributes that bear on the capability of software to maintain its level of performance under stated conditions for a stated period of time. Usability includes fault-tolerance, understanding, and implementation. The interface must attract users and have clear guidelines. Efficiency is the system's ability to provide suitable functions to optimize

resources and improve performance in specific conditions. Maintainability is the ability to identify and fix a fault within a software component is what the maintainability characteristic addresses. Portability refers to how well the software can adapt to changes in its environment or with its requirements (Nhan, 2014).

Hypotheses

Based on the problem of the study, the following hypotheses have been conceived to be tested and interpreted:

H_{oa}: There is no significant difference in the assessment of the two groups of participants on the evaluation of the e-learning system in terms of functionality.

H_{ob}: There is no significant difference in the assessment of the two groups of participants on the evaluation of the e-learning system in terms of reliability.

H_{oc}: There is no significant difference in the assessment of the two groups of participants on the evaluation of the e-learning system in terms of usability.

H_{od}: There is no significant difference in the assessment of the two groups of participants on the evaluation of the e-learning system in terms of efficiency.

METHODOLOGY

To be able to provide answers to the research questions and to test and interpret the hypotheses, the following research design and methods were employed. The researcher used the descriptive method to assess the E-Learning System.

Participants of the Study

The participants of the study were students from Kolehiyo ng Lungsod ng Lipa (KLL) under the College of Teacher Education who were enrolled in Bachelor of Elementary Education (BEED) major in Special Education (SPED) during the second semester, academic year 2017-2018. The sample size of the study is 93. The researchers used purposive sampling considering the availability of the student participants. Statistical tests were used in rejecting the null hypothesis. The researchers considered the response of the teachers in assessing the E-Learning System. However, only one teacher attended the seminar due to conflict with class schedule.

The dean of the college stated that students with hearing and speaking difficulties are combined with the regular class. Conducting a class for a mixed group is a challenge for the professors and at the same time for the students with visual and hearing impairment. To resolve the problem and lessen the language barrier, students are taught sign language at 2nd year level. With this approach, nondisabled and PWD students can

communicate. To augment the gap in sign language, 3rd and 4th year students who are proficient in sign language assist professors by interpreting lessons in class.

Data Gathering Instrument

The researchers utilized a self-made questionnaire to gather necessary data to evaluate the E-Learning system based on the ISO 9126 software quality metrics. The questionnaires consisted of three parts: profile of the participants; E-Learning System and E-Learning resources; evaluation of E-Learning System in terms of Functionality, Reliability, Usability, and Efficiency. The participants were guided with the use of a scale of 1-4 with 1 as the lowest and 4 as the highest as the basis for the quantitative result.

The researchers omitted maintainability and portability characteristics of ISO 9126 as part of the questionnaire. The sub-characteristics under maintainability are too specific to be measured by the participants. It may require a separate evaluation in diagnosing and testing to assess the stability of the system.

Data Gathering Procedures

The researchers asked permission from the College Administrator of Kolehiyo ng Lungsod ng Lipa (KLL) to conduct a research study in their institution. The researchers conducted a school visit, 30-minute classroom observation, and interview with the dean, SPED teacher, and BEED-SPED students.

The researchers also conducted a whole day seminar-workshop on the use of computers, internet, mobile phone, and E-learning system. There were 98 attendees in the seminar composed of a SPED teacher and students from first year to fourth year BEED-SPED students from the College of Teacher Education. Some of the students have hearing and speaking difficulties.   The researchers distributed the survey to the participants. Before the discussion of the first speaker, the student-participants answered the first two parts of the questionnaire, the profile of the students, and the awareness of the students in using the internet, E-Learning resources, and E-Learning System. The topic of the second speaker was on the use of Schoology as an E-Learning system using smartphones, and suggested mobile technology applications for education. After the discussion of the last speaker, the student-participants answered parts 3 to 5 of the questionnaire. Ninety-three (93) survey questionnaires were retrieved.

To facilitate the learning process of PWD student participants, higher year students interpreted the topics using sign language simultaneously while the speakers are presenting.

The researchers distributed the seminar evaluation to determine the feedback of the attendees on the seminar. The data were gathered and tallied, and an analysis of the data followed.

Data Analysis

Weighted mean and composite mean were utilized to describe the result of the survey (Table 1). To determine the result of the evaluation, the numerical values presented below, and its corresponding verbal interpretation were used to interpret the computed composite mean:

Table 1. Verbal Interpretation to Describe the Participants' Assessment on E-Learning System

Scale	Statistical Limit	Verbal Interpretation
4	3.25–4.00	Strongly Agree (SA); Highly Functional (HF)/ Highly Reliable (HR)/ Highly Usable (HU)/ Highly Efficient (HE)
3	2.50–3.24	Agree (A); Functional (F)/ Reliable (R)/ Usable (U)/ Efficient (E)
2	1.75–2.49	Disagree (D); Moderately Functional (MF)/Moderately Reliable (MR)/ Moderately Usable (MU)/ Moderately Efficient (ME)
1	1.00–1.74	Strongly Disagree (SD); Not Functional (NF)/ Not Reliable (NR)/ Not Usable (NU)/ Not Efficient (NE)

The z-test was used to find the significant difference of responses between students and professionals since the sample size is more than 30. According to Broto (2007), z-test is used to compare the means of two independent groups of samples drawn from normal population if there are more than 30 samples.

RESULTS AND DISCUSSION

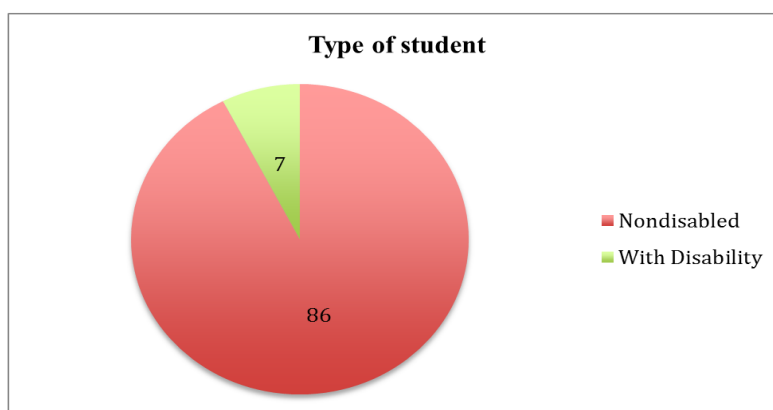The following are the results and discussion of the study.

Figure 2. Profile of the Students in Terms of Disability

Seven (7) out of 93 students are persons with disability (PWD) which can be seen in Figure 2. They are students with hearing and speaking problems. The students with disability are joined in the regular class of BEED major in SPED.

According to Aleke & Akaniyere (2015), education (teaching and learning) is simplified through the use of E-Learning resources. The use of ICT involves effective teaching and learning with the assistance of computer and other information technology acting as aids which performs the complementary functions in the teaching and learning environment. Figure 3 shows the most commonly used E-Learning resources in the classroom, 86 or 92% of the students use laptop computers and smartphones. It was followed by mobile application with a percentage of 86% or 80. Sixty-six (66) or 71% of the students use the Internet and 50 or 54% use video tutorials. Meanwhile, desktop computers, video conferencing, e-books, and email facilities were used by the students with a percentage of 42%, 23%, 20% and 18%, respectively. Moreover, e-journals, electronic devices, and digital libraries are the least E-Learning resources used by the students with a percentage of 26%, 13%, and 12%, respectively. Smartphones, laptop computers and Internet are personal use of the students and teachers.
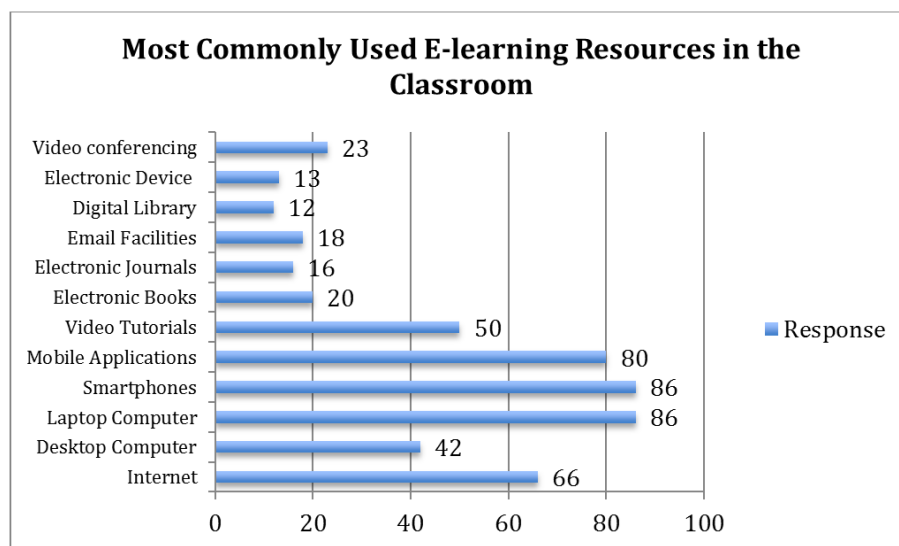

Figure 3. Most Commonly Used E-Learning resources

Table 2 reveals the assessment of the two groups in using the E-Learning System in terms of functionality. It can be seen in the table that the student-participants with hearing and speaking disabilities assessed the E-Learning System as highly functional with a composite mean of 3.31. The participants strongly agreed that the E-Learning System has the capability to download course material and can manage group discussion with the highest weighted mean of 3.57. Furthermore, the students agreed that the E-Learning System has the capability to access content from, and provide content to digital libraries and other E-Learning systems; has the capability to upload file; describe how digital resources can be organized; can manage group discussion with the weighted mean of 3.14.

Table 2. Assessment of Two Groups of Participants in Using E-learning System
in Terms of Functionality

FUNCTIONALITY	With Disabilities		Nondisabled		Overall	
The Schoology, as an e-learning system…	WM	VI	WM	VI	WM	VI
1 has the capability to access content from, and provide content to digital libraries and other E-Learning systems.	3.14	A	3.65	SA	3.40	SA
2 has the capability to download course material.	3.57	SA	3.63	SA	3.60	SA
3 has the capability to upload file (e.g., assignments, lessons, etc.).	3.14	A	3.78	SA	3.46	SA
4 describes how to sequence activities within the course.	3.29	SA	3.66	SA	3.47	SA
5 describes how digital resources can be organized (e.g., lessons, activities, etc.).	3.14	A	3.70	SA	3.42	SA
6 enables shareable, durable, and reusable web-based learning content.	3.29	SA	3.60	SA	3.45	SA
7 can identify and authenticate faculty and students where username and passwords will be used.	3.43	SA	3.69	SA	3.56	SA
8 has password protection of all courses, events and resources.	3.43	SA	3.67	SA	3.55	SA
9 has the capability to private messaging or faculty-to-student messaging.	3.57	SA	3.64	SA	3.61	SA
10 can manage group discussion.	3.14	A	3.69	SA	3.41	SA
Composite Mean	3.31	HF	3.67	HF	3.49	HF

On the other hand, the nondisabled student-participants assessed the E-Learning System as highly functional with a composite mean of 3.67. The students strongly agreed that the E-Learning system has the capability to upload a file with the highest weighted mean of 3.78. They also strongly agreed that the E-Learning System describes how digital resources can be organized with a weighted mean of 3.70. Likewise, the participants strongly agreed that the E-Learning System could identify and authenticate faculty and students where username and passwords will be used and can manage group discussion.

In general, the two groups of participants assessed the E-Learning System as highly functional with a composite of 3.49. The capability of the E-Learning System in terms of uploading is one of the important features of the system.

Table 3. Assessment of the Two Groups of Participants in Using E-learning System
in Terms of Reliability

RELIABILITY	With Disabilities		Nondisabled		Overall	
The Schoology, as an e-learning system…	WM	VI	WM	VI	WM	VI
1 has a low frequency system failure.	3.14	A	2.86	A	3.00	A
2 has no presence of faults/software bugs.	3.43	SA	2.86	A	3.14	A
3 has the ability to maintain a specified level of performance or continue functioning in the event of software faults.	3.14	A	3.19	A	3.16	A
4 responses to invalid input data	3.29	SA	3.17	A	3.23	A
5 allows user to take corrective action once an error has been recognized by the system.	3.00	A	3.28	SA	3.14	A
Composite Mean	3.20	R	3.07	R	3.14	R

Table 3 shows the results of the assessment of the two groups of participants in terms of reliability. The data disclosed that the student-participants with hearing and speaking disabilities assessed the E-Learning system as reliable with the composite mean of 3.20. The participants strongly agreed that the E-Learning System has no presence of faults/software bugs with a weighted mean of 3.43 and the system responses to invalid input data with a weighted mean of 3.29. Meanwhile, the nondisabled participants also strongly agreed that the system allows the user to take corrective action once an error has been recognized by the system with a weighted mean of 3.28. In addition, the participants agreed on the statements that the E-Learning System has a low frequency system failure, and the system has no presence of faults/software bugs with a weighted mean of 2.86.

To sum up, the two groups of participants assessed the E-Learning system as reliable with a composite mean of 3.14. The participants agreed on the statements "the E-Learning System responses to invalid input data" with the highest weighted mean of 3.23, and "the system has the ability to maintain a specified level of performance or continue functioning in the event of software faults" with a weighted mean of 3.16.

Table 4 shows the assessment of the two groups in using the E-Learning System in terms of usability. The participants with speaking and hearing disabilities assessed the system as highly usable with a composite mean of 3.27. The participants strongly agreed on the statements that the E-Learning System has useful help messages on the screen, has a pleasant system interface, and has an effective help system with the highest weighted mean of 3.43. Likewise, the nondisabled student-participants assessed the E-Learning System as highly usable with a composite mean of 3.55. The participants strongly agreed to the statement that the E-Learning System has functional buttons with the highest weighted mean of 3.62. The statements "the system has a pleasant system

interface" and "the system has useful help messages on the screen" have a weighted mean of 3.60 and 3.59, respectively. In general, the two groups of participants assessed the E-Learning system as highly usable with a composite mean of 3.41.

Table 4. Assessment of the Two Groups of Participants in Using E-Learning System in Terms of Usability

USABILITY	With Disabilities		Nondisabled		Overall	
The Schoology, as an e-learning system…	WM	VI	WM	VI	WM	VI
1 has functional buttons.	3.29	SA	3.62	SA	3.45	SA
2 has consistency of layout	3.14	A	3.57	SA	3.36	SA
3 has consistent use of terms throughout the system.	3.14	A	3.52	SA	3.33	SA
4 has a clear prompts for inputs	3.14	A	3.50	SA	3.32	SA
5 has useful help messages on the screen.	3.43	SA	3.59	SA	3.51	SA
6 has a pleasant system interface	3.43	SA	3.60	SA	3.52	SA
7 has an effective help system	3.43	SA	3.58	SA	3.50	SA
8 can be operated easily	3.29	SA	3.44	SA	3.36	SA
9 has ease of finding required information	3.14	A	3.57	SA	3.36	SA
10 has an attractive systems interface	3.29	SA	3.49	SA	3.39	SA
Composite Mean	3.27	HU	3.55	HU	3.41	HU

As perceived by the student-participants with hearing and speaking disabilities, it can be seen in Table 5 that the E-Learning System is efficient with a composite mean of 3.20. The participants strongly agreed on the statements "the E-Learning System has an acceptable level of performance when large numbers of users accessing the system at any one time", "can locate operations and information quickly", and "can perform a sequence of operation" this obtained the highest weighted mean of 3.29. Meanwhile, the nondisabled student-participants assessed the system as highly efficient with a composite mean of 3.52. The statements "the system provides appropriate response time when performing various function" and "the system can perform a sequence of operation" got the highest weighted mean of 3.57. In general, the two groups of participants assessed the E-Learning System as highly efficient with a composite mean of 3.36.

Table 5. Assessment of Two Groups of Participants in Using E-learning System
in Terms of Efficiency

EFFICIENCY	With Disabilities		Nondisabled		Overall	
The Schoology, as an e-learning system…	WM	VI	WM	VI	WM	VI
1 provides appropriate response time when performing various function (e.g. uploading/ downloading files).	3.14	A	3.57	SA	3.36	SA
2 has an acceptable level of performance when large numbers of users accessing the system at any one time	3.29	SA	3.49	SA	3.39	SA
3 can handle large documents.	3.00	A	3.41	SA	3.20	A
4 can locate operations and information quickly.	3.29	SA	3.55	SA	3.42	SA
5 can perform a sequence of operation.	3.29	SA	3.57	SA	3.43	SA
Composite Mean	3.20	E	3.52	HE	3.36	HE

For the overall assessment of the student-participants in using the E-learning System which can be seen in Table 6, the two group participants strongly agreed that E-learning System increases the quality of learning because it integrates all forms of media with a weighted mean of 3.74 and believed that E-learning System gives the opportunity to acquire new knowledge with a weighted mean of 3.70. Likewise, the participants believed that E-learning System enhances their learning experience with a weighted mean of 3.69.

Table 6. Overall Assessment of the Student-participants in Using E-learning System

Overall Assessment	With Disabilities		Nondisabled		Overall	
	WM	VI	WM	VI	WM	VI
1 I believe that E-learning system gives me the opportunity to acquire new knowledge.	3.57	SA	3.84	SA	3.70	SA
2 I believe that E-learning system enhances my learning experience.	3.57	SA	3.81	SA	3.69	SA
3 I believe that convenience is an important feature of E-learning system	3.14	A	3.76	SA	3.45	SA
4 I believe that E-learning system increases the quality of learning because it integrates all forms of media	3.71	SA	3.76	SA	3.74	SA
5 I would be interested in studying course that uses E-learning system	3.43	SA	3.73	SA	3.58	SA
Composite Mean	3.48	SA	3.78	SA	3.63	SA

Table 7. Summary of Computation in Testing the Difference between the Assessment of the Two Groups of Participants on their Evaluation on the E-Learning System

Variables	Two groups of participants	Mean	Computed value	Tabular Value	Decision ($\alpha = .05$)	Verbal Interpretation
Functionality	With disabilities	3.31	-0.271		Failed to reject H_{oa}	Not Significant
	Nondisabled	3.67				
Reliability	With disabilities	3.20	0.102		Failed to reject H_{ob}	Not Significant
	Nondisabled	3.07		±1.96		
Usability	With disabilities	3.27	-0.214		Failed to reject H_{oc}	Not Significant
	Nondisabled	3.55				
Efficiency	With disabilities	3.20	-0.250		Failed to reject H_{od}	Not Significant
	Nondisabled	3.52				

Table 7 shows the summary of computation in testing the difference between the assessment of the two groups of participants on their evaluation of the E-learning system. Since the computed values of all variables (i.e., functionality: -0.271, reliability: 0.102, usability: -0.214, and efficiency: -0.250 did not exceed the tabular value of +/-1.96, the null hypotheses are hereby accepted. This implies that there is no significant difference between the assessments of nondisabled students and students with disabilities to the E-Learning System. The reason could be because these students belong to the same course. The two groups of participants see the importance of using the e-learning system as a student and as a future educator.

Parton (2004) cited that the language competence of the teacher is the primary means of students acquiring knowledge and information. For good outcomes, a wide variety of services and techniques can be implemented not just for Deaf students but also for the teacher and interpreters who represent them. It was mentioned in the study of Permvattana and Hollier (2013) that normal learners can understand and access all available features of the web-based learning environment. Meanwhile, deaf & mute learners depend only on the graphics and objects disregarding sounds and audio. Moreover, the success of E-learning in higher education depends on the efficacy of the implementation of E-learning programs and on the adequate training for teachers (El-Seoud et al., 2013).

Proposed Action Plan

Table 8 shows the strategies for the proposed action plan for the realization of the E-Learning System for Bachelor of Elementary Education-Special Education class of Kolehiyo ng Lungsod ng Lipa.

Table 8. Proposed Action Plan for Kolehiyo ng Lungsod ng Lipa

Objectives	Strategies	Expected Outcome
To formulate the Short-Term, Medium-Term, and Long-Term ICT Modernization Plan and Information System Plan including E-Learning System.	Conduct research, assessment, and environmental scanning; Conduct workshops, consultation meetings, and benchmarking Seek guidance and assistance from concerned government agencies.	ICT Modernization Plan (Short-, Medium-, and Long-Term) and Information System Plan including E-Learning System formulated.
To conduct ICT and E-Learning System capacity-building activities and skills enhancements for the professors, administrative staff, and students.	Search for possible training sponsors; Conduct in-house and outside ICT and E-learning System training, workshops, seminars; Secure budget allocation for training.	Professors, Administration Staff, and Students capacitated and skills enhanced on ICT and E-Learning System.
To formulate implementing guidelines on the use of Mobile Technology and E-Learning System.	Conduct research on the implementation guidelines; Conduct workshops and consultation meetings; Prepare the implementing guidelines.	Formulated guidelines on the use of Mobile Technology and E-Learning System.
To monitor and evaluate plans, programs, projects, and activities.	Conduct monitoring on programs, projects, and activities implementation; Revisit/revise plans, programs, projects and activities as necessary.	Plans, Programs, Projects, and Activities monitored and evaluated.

CONCLUSIONS AND RECOMMENDATIONS

Based on the objectives set forth for the study and the findings presented, the following conclusions were drawn: findings showed that the majority are nondisabled students. The most commonly used E-Learning resources in the classroom are

smartphones and laptop computers. While many students and teachers were willing to embrace the E-Learning system, there is still a need for access to other E-Learning resources, and ICT platforms. Using ISO 9126 software quality metrics, findings revealed that the Schoology E-Learning System was highly functional, highly usable, highly efficient, and reliable. As depicted in the result of the study, since the computed values of all variables did not exceed the tabular value, the null hypotheses are hereby accepted. This implies that there is no significant difference between the assessments of nondisabled students and students with disabilities with regards to the E-Learning System. A proposed course of action was formulated for the implementation of an E-Learning System for Bachelor of Elementary Education major in Special Education class at Kolehiyo ng Lungsod ng Lipa-College of Teacher Education.

The following recommendations are suggested for the proper utilization of mobile technology and the E-learning system for the Kolehiyo ng Lungsod ng Lipa - College of Teacher: the college should start investing in ICT modernization prior to the integration of the E-learning system in the curriculum. Integrating a blended learning strategy into the educational program would bring benefits of both conventional and E-learning modes. Internet connectivity should be a priority to be established to benefit all the delivery models such as face-to-face, self-paced, and individualized learning along with virtual interactions.

Integrating mobile learning may help overcome concerns with connectivity and convenience to a great extent. Leveraging on the utilization of mobile phones, there should be regular capacity-building activities and skills enhancements on E-Learning System and other related software and tools among the professors, and students. Strategies, arrangements, and measures for E-learning should be monitored and maintained. It is crucial to monitor and evaluate ICT and Information System plans, programs, projects, and activities implementation through the use of various project management tools and techniques. E-learning designers may consider the existence of the users with hearing and speaking disabilities to develop an e-learning environment that may be effective for all users generally.

PRACTICAL IMPLICATIONS

Academic institutions would be able to adopt the same approach of using E-learning system though mobile technology to handle students with speaking and hearing problems in delivering teaching and learning.

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