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Readiness for E-Learning and Utilization of Learning Management Systems among Electronics Engineering Students in a Private Institution

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Abstract : This study aimed to determine the Readiness to E-Learning and Learning Management System of Electronics Engineering Students in a Private College. The study employed the descriptive-survey design. The study was conducted in Santiago City, Isabela, where online learning is currently implemented. The participants were undergraduate electronics engineering students enrolled. Results revealed that the electronics engineering students are very ready to online learning in terms of motivation to learn. However, they are somewhat ready in terms of computer/ internet self-efficacy, self-directed learning, learner control and online communication self-efficacy. The electronics engineering students are somewhat ready to learning management systems in terms of online simulation and Microsoft Teams. The contribution of online learning and learning management system to the readiness of electronics engineering students are positive impressions on online learning, independent learning and first-hand knowledge.

IndexTerms **- Electronics Engineering, Learning Management System, Readiness, Online Learning**

I. INTRODUCTION

In education, quality classroom management focuses with the enhancement of the teaching-learning process. Among the factors affecting this process is the learning environment in the institution (Stukalina, 2010). Researchers analyzed the development of the learning environment management system in the schools and used these as guidelines for the betterment of the learning environment. The utilization of information technology as one of the aspects for the development of learning environment has changed the culture of teaching-learning process (Wirussawa et. al., 2016).

Online learning is "a form of distance education, a process that traditionally included courses taught through the mail, by DVD, or via telephone or TV-any form of learning that does not involve the traditional classroom setting in which students and instructor must be in the same place at the same time" and called as e-learning, that is to say, electronic learning as well (Ko and Rossen, 2010, p.3). There were several research works that already investigated online learning to examine the effectiveness of technology design and pedagogical design approach (Hsu et al., 2012), the students' and teachers' perceptions, preferences, and expectations, and styles of teaching and learning online (Martin, Ahlgrim-Delzell, & Budhrani, 2017). Meanwhile, other studies claimed that this enhances teaching effectiveness (Akhondi, 2011). The flexibility it offers allows learners to plan and schedule their learning at their own pace which increases satisfaction and reduces the stress that may affect their performance and it also benefits economically by reducing expenses like the travel cost (Cigdem et. al, 2016).

The rapid pace of technological and economic advancement poses a challenge to educational institutions which demands quality teaching and learning processes, thus for the institution to adapt with these changes, it must embrace e-learning opportunities. E-learning provides flexibility and convenience for both the teacher and learner since it provides easy access to education. With e-learning, anyone can learn beyond the confines of time and place (Epping, 2010).

A Learning Management System (LMS) helps to augment educational needs of both teacher and learner. Every educator and learner deals with it as an all-in-one platform allowing them to manage their needs in any condition. Based on the framework of an e-learning system, significant instructional activities such as instructional management, collaboration, assessment and guidance are used to efficiently address educational needs (Thuseethan et. al., 2015). For example, using electronic mail or email as means of communicating with students, online module preparations, and digital class records are just basic ingredients of implementing LMS on a digital age.

However, flexibility and deeper technical ideas can bring a real experience of online approach to teaching and learning. Inclusion of various kinds of multimedia lectures such as videos (e.g. YouTube, EdTV, and other video streaming platform), audio in various forms is just one of the simple ways of spicing up lectures in the module. LMS also has the capability of setting up means to have communications with their teachers and each other (Kadir & Aziz, 2015). And most importantly, they use it for conducting online quizzes, submissions of homework and groups.

Nowadays, many higher education institutions are utilizing the use of LMS since it provides for flexible teaching and learning. There are three aspects which highlight the use of online learning: Pedagogical Improvement, Increased Access and Flexibility and Cost-Effectiveness. Some LMSs can be developed intentionally based on specific pedagogical strategies and some

are used freely that have no pedagogical strategies being used at all. Moreover, LMS's can emphasize from a pedagogical point of view a more learner-entered approach or teacher-centered approach.

Access is one of the factors affecting the growth of learning environments which is why LMS makes learning possible regardless of whether the learners have most of their learning experience away from teachers or other learners.

Practicality dictates that education must be cost-effective. Online learning is one of the best cost-effective solutions in higher education as it provides an opportunity for reaching a large, globally dispersed audience in a short period of time with consistent content delivery.

These features of LMS pave the way for this higher education institution to standardize its instruction mandate according to its quality management system. In addition, it was proven by an experimental study that LMS has a positive contribution to quality teaching and learning process (Weaver et.al., 2008). Furthermore, LMS presents opportunities for the institution to adapt with the rapid pace of technological and economic advancement happening in the country. Also, LMS shows promising results when it is combined with an advanced collaborative tool in web-based teaching of programming languages. But the faculty and students, as the direct implementors and receivers must embrace the new innovations brought by technology integration for it to be successful (Akaslan & Law, 2011).

Background of the Study

Student e-readiness is as important to better understand how to achieve effective online learning. It is indispensable to recognize what dimensions of online learning readiness college students should possess and what dimensions were possibly omitted in past research. Similarly, to the teachers, learners' perceptions of the Internet shape the learners' attitudes and online behaviors (Gay, 2016).

The researchers believes that there is only a little information when it comes to students' readiness to transition on online learning for engineering students. Hence, there is a need to explore and understand the engineering students' readiness and response to this situation that may affect their learning development and outcome.

Addressing this problem will not only help engineering students but it can contribute in providing possible interventions in educational transformation in the field. With the aim and desire of addressing its learners' diverse needs during this time of pandemic and in ensuring the appropriateness and suitability of the learning materials being prepared, the proponent believed that conducting a study on this activity is deemed essential. Anent to this, this research primarily aimed to determine the readiness to e-learning and Learning Management System of electronics engineering students in a Private Institution.

Research Questions

1. What is the level of readiness of electronics engineering students when it comes to online learning:
   - 1.1 Computer/Internet Self-efficacy
   - 1.2 Self-directed Learning
   - 1.3 Learner Control
   - 1.4 Motivation to Learn
   - 1.5 Online Communication Self-efficacy
2. What is the feedback of the electronics engineering students on the learning management system in terms of:
   - 2.1 Online simulation
   - 2.2 Microsoft teams
3. What is the online learning and learning management system contributions to electronics engineering students?
4. What measures may be proposed to improve the readiness of electronics engineering students in online learning and learning management system?

Significance of the Study

The study provided a better understanding of electronics engineering students' readiness to online learning and learning management system. These findings of the study will contribute on engineering community, especially the engineering educators and engineering heads of different schools by giving information that can be used to craft possible effective interventions to maintain the quality education, process a smooth transition to online learning and create action plans necessary and needed to ensure a quality engineer in the future. In addition, engineering education will also benefit from this study through the data gathered and collected can be used to make and if possible, implement suitable programs or framework for this kind of set up which can be very useful in the future.

Theoretical Framework

This study was anchored on online collaborative learning theory (OCL) by Harasim (2012). OCL is a theory proposed by Linda Harasim that focuses on the facilities of the internet to provide learning environments that foster collaboration and knowledge building. Linda Harasim describes OCL as a new theory of learning that focuses on collaborative learning, knowledge and internet use as a means to reshape formal, non-formal and informal education for the Knowledge Age. (Harasim, 2012)

OCL also derives from social constructivism, since students are encouraged to collaboratively solve problems through discourse and where the teacher plays the role of facilitator, as well as learning community member. This is a major aspect of OCL but also of other constructivist theories where the teacher is not necessarily separate and apart but rather, an active facilitator of knowledge building. This study utilized the online collaborative learning theory by Linda Harasim since this theory is about online learning and learning management system for school year 2021-2022. This theory served as a guide in understanding the readiness of students.

Conceptual Framework

This research study utilized the IPO model. The input was the level of readiness of electronics engineering students to online learning and learning management system. In the process section, it was the feedback of the participants on the integration of online learning and learning management system in terms of online simulation and Microsoft teams that attempt to ascertain if

online learning and learning management system helped the readiness of the electronics engineering students during the school year 2021-2022. Thus, this paved the way for an intervention scheme which is the proposed measures to improve the readiness of electronics engineering students in online learning and learning management system.

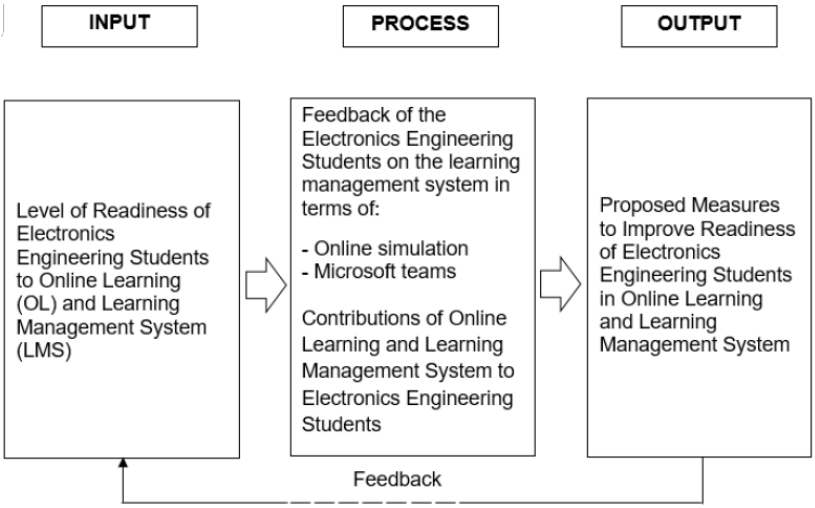

Figure 1. Paradigm of the Study

Literature Review

Online Education in Higher Education On the study conducted by Rosenblit (2009), different set of tools and technologies are used in an online learning environment, for example, internet mediated teaching, web-based education, TV and radio broadcast, virtual classrooms and distributed learning. Studies show that online learning, like distance learning, blended learning and mobile learning is a form of digital learning which comprises various learning activities, digital services and global networks aiming to reach its educational goals.

The application of emerging development of immersive technologies used for visualization and interactions also affects online learning. The use of these immersive environments like integration of e-learning, virtual reality and virtual worlds to have advantage in improving the learners' concentration and their ability to control over the learning environment develop the learners' psychomotor, cognitive, and affective skills, and engineering profession-related skills such as problem-solving, application of what has been learned, communication, and collaboration (Radianti et. al, 2020).

Readiness for Online Learning

It is evident that there are already a lot of studies concerning online learning readiness in higher education, but there is a little information when it comes to their readiness, most especially in the sudden transition process that everyone is experiencing right now, most especially for engineering students.

Readiness is said to influence the intentions and reactions, exemplified by the attitude outcomes or actual behaviors in which they may commit themselves to, which affects the outcome of change. In organizational studies, the change for readiness is defined as employees' beliefs on the appropriateness, support and value of change. Thus, it is very crucial to analyze and assess whether the recipient is ready for change. Du and Chaaban (2020) stated that when a recipient (i.e., students) is unprepared for change, they may display negative attitudes and low motivation which can limit their engagement, commitment, and long-term achievement.

Furthermore, this study is anchored on the theoretical foundation of connectivism, a theoretical perspective which explains the learning process in the current digitally networked age. According to this theory, knowledge is in the form of distributed knowledge; such knowledge is created collaboratively, stored, and disseminated across a network of connections (Downes, 2012). This releases the learner from the cognitive practices of acquiring knowledge through experience, study, and electronics engineering instruction. In addition, connectivism is acquiring the knowledge or learning that occurs across and within the networks of connections, and learners make connections, construct, and navigate the networks in the process of learning. This theory is appropriate for the study since technology is permitted to become part of the students' internal learning process on online learning readiness.

Student Readiness on Online Learning Research shows positive relationships between technology experience and positive attitudes, aptitudes and ease in using technologies such as computers, as well as negative relationships between technology experience and computer/technology anxiety. Furthermore, when it comes to student readiness to online learning, previous research supported the importance of measuring students' online readiness before taking online course as well as the significant impact of student readiness on student academic achievement within online learning environments. In addition, a study showed that providing adequate social and academic support services enhances the students' belongingness in online learning both for increased meaningful learning experiences and higher retention rates (Wingenbach, & Akers, 2012).

Students' Online Learning Readiness Scale (OLRS)

Through the years, online learning readiness scale were developed to measure comprehensively the online learning readiness of students. In 2010, a comprehensive scale was developed comprising aspects in five dimensions namely 1) computer/ internet self-efficacy, 2) self-directed learning, 3) learner control, 4) motivation for learning and 5) online communication self-efficacy. Its validity and reliability was evaluated through examining the composite, convergent and discriminant validities and deemed to be acceptable (Hung et. al, 2010).

Computer/Internet self-efficacy

Online learning uses available technology in delivering lessons so it is important for students to be able to familiarize with the use of available technology such as computer and internet.

Computer and internet self-efficacy are concepts proposed by Hung et al. (2010). This combines computer self-efficacy which represents an individual's perception of his or her ability to use computers to accomplish a task and internet self-efficacy which is one's ability to apply higher-level skills such as troubleshooting problems. This is students' technology-related knowledge, skills, attitudes, and competencies in utilizing technologies such as computer and the internet to achieve educational aims and expectations in higher education (Hong & Kim, 2018).

Self-directed learning

Self-directed learning is a learning strategy which allows individuals to understand and control their learning needs, learning goals, learning resources, learning strategies, and learning outcomes. In an online learning setting an individual should make their own decisions to meet their needs at their own pace in order to be successful (Lin and Hsieh, 2001).

Learner control

Traditional face to face is very much different on online learning per se. Online learning requires more of the learners' willingness to direct their own learning. Due to online learning's flexibility and freedom, the learners are allowed to choose what, where, when, and how to learn (Kraiger & Jerden, 2007).

Motivation for learning

Motivation is defined "as the process whereby goal-directed activity is instigated and sustained." Past research shows the effect of motivation on learning. Intrinsic and extrinsic motivation played a great role in the success or failure of online learning. Learners who are motivated are also more likely to adopt a deep approach to learning and are actively engaged with different activities (Schunk et al., 2008).

This motivation for learning helps the learners to do their own desires to enhance their learning and development.

Online communication self-efficacy

Due to absence of face to face interaction, an online communication is very important in online learning. There should be opportunities for interactions and communications between students and their instructors for them to voice out their emotions, insights and even ask questions. A successful learner should make the most of online discussions (Roper, 2007).

Factors Affecting Online Readiness

A study conducted by Doculan (2014) on assessing the level of preparedness of Ifugao State University towards e-learning when it comes to technology access, skills and attitudes of learners and teachers, and management to which it also analyzes the factors like age, gender, cultural affiliation and accreditation status if there is an effect in e-learning readiness of teachers, learners and the institution as a whole shows that for students, there is a need on the improvement on students' internet skills such as downloading PDF and using file compression tools when it comes to their technology skills. Result on students' attitudes towards e-learning shows that students need improvement on their abilities and motivation. Furthermore, it shows that gender and ethnic affiliation are not statistically significant when it comes to technology access and suggests that the higher the accreditation level of a program, the greater skills and access to technology by the learners and teachers are needed. Furthermore, it shows that age is significantly related to technology access and skills as gender is significantly related to technological skills.

Findings from Rafique et al. (2021) showed that mature students tend to be more ready on online learning than those younger students. In addition, Zulaikha et al. (2020) concluded that the availability of technology and their acceptance to learn were the uncertainties of students when it comes to online distance learning.

Access to technology is a factor that is needed to enhance online learning experience for lecturer and student in addition to motivation, expectancy, facilitation, and condition as a framework to online learning pedagogy (Gunasinghe et.al, 2019).

Learning Management System

The learning management system (LMS) is an all-in-one platform used for online learning. This helps in delivering the educational needs of both teacher and learner. It allows the educator and learner to manage their needs and interact virtually in any condition. It is based on the framework of an e-learning system and instructional activities which augments and addresses educational needs. The LMS is a flexible approach to conducting online quizzes, submissions of homework and assignment preparations, chat activities, and discussion groups (Dela Cruz and Catura, 2020). LMS users gain access to material and information disseminated by the instructor in synchronous or asynchronous settings (Alzahrani, 2019; Jung & Huh, 2019; Kuosa et al., 2016; Watson and Watson, 2012). Further, LMS integrates the use of electronic mail or email as means of communicating with students, online module preparations, and digital class records (Thuseethan et. al, 2015) which can be easily accessed by both teachers and learners.

Teachers and learners experienced challenges and difficulties while using LMS. The study of Aljaloud (2012) identified content-specific barriers and school/administration/region-specific barriers by teachers and students in Saudi Arabian institutions due to a lack of technical skills and accessibility. However, according to Agudo-Peregrina et al. (2014), the use of LMS has positive impact which includes a significant influence on the academic achievement in online courses and this was affirmed by Nair (2012) where they found that students' learning skills have improved in courses where LMS is used.

In online environments, instructors use LMS to facilitate and deliver discussions, manage learning expectations, provide learners with choices, set, and schedule online activities and assist learners in solving problems and making decisions (Jung & Huh, 2019; Murcia, 2016). On the other hand, a study conducted by Dela Cruz and Catura (2020) showed that a successful LMS can be determined by the online readiness of both teachers and students.

II. METHODS

Research Design

This study utilized descriptive survey research design. Descriptive-survey research uses surveys to gather data about varying subjects. This data aims to know the extent to which different conditions can be obtained among these subjects. Quantitative data such as the Mean and Percentage are based on the participants' responses.

Study Sites and Participants

The study was conducted in a private college in Santiago City, Isabela, where online learning is currently implemented. The participants were undergraduate electronics engineering students enrolled.

Population, sample size and Sampling Method

The population of the study was 30 electronics engineering students. Since the population is 30, the researchers made use of a complete enumeration in choosing the participants.

Instruments

The Online Learning Readiness Scale (OLSR) developed by Hung et al. (2010) was adopted and used as a research instrument and tool with permission from the main author in order to gather data and information from the participants. The instrument was validated by several studies with a scale reliability of between 0.727 to 0.871 (Hung et. al, 2010) and affirmed by the study of Chung et al.(2020) which shows a reliability scale between 0.841 to 0.911. The structured questionnaire generated the respondents' profile, online readiness, and feedback of students to learning management system. Pilot testing of the structured questionnaire was conducted on a sample of ten randomly selected participants to further ensure validity and reliability. The result of the pilot test was reviewed and evaluated using the Cronbach alpha tool.

The Cronbach alpha results summarizes the following: the dimensions of online learning readiness, the computed alpha was .93 with an internal consistency remark or excellent. For Self–Directed Learning, it reached .99 alpha test, the same internal consistency which is excellent. Meanwhile, for Learner Control (in an online context), it has .85 test result, with internal consistency as good. For motivation for learning, it has .74, acceptable internal consistency. And for online communication self–efficacy it resulted to .94 with internal consistency as excellent. For part 2, Feedback of electronics engineering students on the Learning Management System, online simulation Cronbach alpha test resulted to .92, internal consistency of excellent, while the questions under Microsoft teams resulted in .84, interpreted as "good" for the internal consistency.

Data Gathering Procedure

Amidst the current Global Pandemic COVID-19 with protocols needed to be followed, it was expected that to conduct the study, the researchers used the technology in collecting the data through the Google form application.

At the beginning of data gathering, the researchers asked permission from the president of the school to conduct the undertaking on the institution. Upon the approval of the president, the researchers further asked the help of the head of the electronics engineering department to send the questionnaire created in Google forms to electronics engineering students. The data was gathered and consolidated through Google drive server.

Lastly, the researchers retrieved the questionnaires and endorsed them to the statistician for some help in the data treatment using the different research statistical tools and the data gathered were analyzed, interpreted, and summarized leading to derive a conclusion and recommendations.

Data Analysis

The study used Descriptive Statistics in processing the data gathered such as frequency, mean and standard deviation to determine the demographic profile of participants, level of electronics engineering students' readiness to online learning, factors affecting their readiness and feedback from students to online learning and learning management system, part 1 to part 2 of the survey. The mean score determined the level of electronics engineering students' readiness to online learning and feedback of students to online learning and learning management system. The researchers used a 5-point Likert scale method of data analysis and interpretation. It is also the most popular choice when it comes to finding people's opinions about something. To facilitate the computation of data, specified scales were employed with their equivalent interpretation. The readiness of the students was categorized as follows:

Option	Range	Description
5	4.2-5.00	Very Ready
4	3.41-4.20	Somewhat Ready
3	2.61-3.40	Moderately Ready
2	1.81-2.60	Slightly Ready
1	1.00-1.80	Not Yet Ready

Ethical Considerations

Participants participated on the basis of informed consent. The principle of informed consent involves the researchers providing sufficient information and assurances about taking part to allow individuals to understand the implications of participation and to reach a fully informed, considered and freely given decision about whether or not to do so, without the exercise of any pressure or coercion.

The participants were informed that their information will be treated with utmost confidentiality. Privacy and anonymity of participants are of paramount importance. The privacy and confidentiality of the participants will be managed carefully during the survey, data analysis and dissemination of the findings. The researchers also made sure to adhere to Data Privacy Act of the Philippines (RA 10173 series of 2012).

The people who took part in the study did so without being forced to. Voluntary participation of participants in the research is important. Moreover, participants have the right to withdraw from the study at any stage if they wish to do so.

III. RESULTS

Part I. Level of Readiness of Electronics Engineering Students to Online Learning

The level of readiness of the electronics engineering students to online learning are classified in terms of computer/internet self-efficacy, self-directed learning, learner control, motivation to learn, and online communication self-efficacy.

1.1 Computer/Internet Self-efficacy

Table 1 shows the level of readiness of the electronic engineering students to online learning in terms of computer/internet self-efficacy.

Table 1 Mean Distribution of the Level of Readiness of Electronic Engineering Students to Online Learning in terms of Computer/Internet Self-Efficacy

Dimensions of Online Learning Readiness	Mean	Interpretation
1. I feel confident in performing the basic functions of Microsoft Office programs (MS Word, MS Excel, and MS PowerPoint).	4.28	Very Ready
2. I feel confident in my knowledge and skills of how to manage software for online learning.	4.18	Somewhat Ready
3. I feel confident in using the Internet (Google, Yahoo) to find or gather information for online learning.	4.25	Very Ready
4. I have the knowledge in simple trouble shooting when internet problems occur.	4.15	Somewhat Ready
5. I understand terms relating internet software's.	4.12	Somewhat Ready
Total Mean	***4.20***	***Somewhat Ready***

As shown in Table 1, the electronics engineering students are very ready when it comes to computer/internet self-efficacy in the following aspects: I feel confident in performing the basic functions of Microsoft Office programs (MS Word, MS Excel, and MS PowerPoint) (*M=4.28*), and I feel confident in using the Internet (Google, Yahoo) to find or gather information for online learning (*M=4.25).* Meanwhile, the electronics engineering students are somewhat ready in the following aspects: I feel confident in my knowledge and skills of how to manage software for online learning (*M=4.18)*; I have the knowledge in simple trouble shooting when internet problems occur (*M=4.15*); and I understand terms relating internet software's (*M=4.12)*. With a grand mean of 4.20, results imply that the electronics engineering students are somewhat ready with online learning in terms of computer/internet self-efficacy.

1.2 Self-directed Learning

Table 2 shows the level of readiness of the electronic engineering students to online learning in terms of self-directed learning.

Table 2 Mean Distribution of the Level of Readiness of Electronic Engineering Students to Online Learning in terms of Self-Directed Learning

Dimensions of Online Learning Readiness	Mean	Interpretation
1. I carry out my own study plan.	3.79	Somewhat Ready
2. I seek assistance when facing learning problems.	3.94	Somewhat Ready
3. I manage time well.	3.75	Somewhat Ready
4. I set up my learning goals.	4.36	Very Ready
5. I have higher expectations for my learning performance.	4. 11	Somewhat Ready
Total Mean	***3.99***	***Somewhat Ready***

As shown in Table 2, the electronics engineering students are very ready in when it comes to online learning in terms of the following aspect of self-directed learning: I set up my learning goals (M=4.36) and somewhat ready in the following aspects; I have higher expectations for my learning performance (M=4.11); I seek assistance when facing learning problems (M=3.94); I carry out my own study plan (M=3.79); and I manage time well (M=3.75). With a grand mean of 3.99, results suggest that the electronics engineering students are somewhat ready with online learning in terms of self-directed learning.

1.3 Learner Control

Table 3 shows the level of readiness of the electronic engineering students to online learning in terms of learner control.

Table 3 Mean Distribution of the Level of Readiness of Electronic Engineering Students to Online Learning in terms of Learner Control

Dimensions of Online Learning Readiness	Mean	Interpretation
1. I can direct my own learning progress.	3.71	Somewhat Ready
2. I am not distracted by other online activities when learning online (instant messages, Internet surfing, FB).	3.53	Somewhat Ready
3. I review online instructional materials on the basis of my needs.	3.61	Somewhat Ready
4. I can learn at my own pace and can submit quality outputs.	3.67	Somewhat Ready
5. I can stay calm and relax on whatever negative circumstances while learning online.	3.58	Somewhat Ready
Total Mean	***3.62***	**Somewhat Ready**

As shown in Table 3, the electronics engineering students are somewhat ready in the following aspects of online learning in terms of learner control: I can direct my own learning progress (M=3.71); I can learn at my own pace and can submit quality

outputs (M=3.67); I review online instructional materials on the basis of my needs (M=3.61); I can stay calm and relax on whatever negative circumstances while learning online (M=3.58); and I am not distracted by other online activities when learning online (instant messages, Internet surfing, FB) (M=3.53). With a grand mean of 3.62, results suggest that the participants are somewhat ready for online learning in terms of learner control.

1.4 Motivation to Learn

Table 4 shows the level of readiness of the electronic engineering students to online learning in terms of motivation to learn.

Table 4 Mean Distribution of the Level of Readiness of Electronic Engineering Students to Online Learning in terms of Motivation for Learning

Dimensions of Online Learning Readiness	Mean	Interpretation
1. I am open to new ideas.	4.40	Very Ready
2. I am motivated to learn.	4.32	Very Ready
3. I improve from my mistakes.	4.20	Somewhat Ready
4. I like to share my ideas with others.	4.11	Somewhat Ready
5. I have this inner drive which is to learn and harness my potentials in learning ICT.	4.04	Somewhat Ready
Total Mean	***4.21***	**Very Ready**

As shown in Table 4, the electronics engineering students are very ready with online learning in terms of motivation for learning in the following aspects: I am open to new ideas (*M=4.40*), and I am motivated to learn (*M=4.32*). Further, the participants are somewhat ready on the following aspects: I improve from my mistakes (*M=4.20*); I like to share my ideas with others (*M=4.11*); and I have this inner drive which is to learn and harness my potentials in learning ICT (*M=4.04*). With a grand mean of 4.21, results imply that the electronics engineering students are very ready with online learning in terms of motivation for learning.

1.5 Online Communication Self-efficacy

Table 5 shows the level of readiness of the electronic engineering students to online learning in terms of online communication self-efficacy.

Table 5 Mean Distribution of the Level of Readiness of Electronic Engineering Students to Online Learning in terms of Online Communication Self-Efficacy

Dimensions of Online Learning Readiness	Mean	Interpretation
1. I feel confident in using online tools (email, discussion) to effectively communicate with others.	4.20	Somewhat Ready
2. I feel confident in expressing myself (emotions and humor) through online text messages/ posting comments	4.17	Somewhat Ready
3. I feel confident in posting questions in online discussions.	4.09	Somewhat Ready
4. I can easily navigate ICT tools utilized in learning.	3.72	Somewhat Ready
5. I can perform and collaborate to group activities.	4.14	Somewhat Ready
Total Mean	***4.06***	**Somewhat Ready**

As shown in Table 5, the electronics engineering students are somewhat ready with online learning in terms of online communication self-efficacy in the following aspects: I feel confident in using online tools (email, discussion) to effectively communicate with others (M=4.20); I feel confident in expressing myself (emotions and humor) through online text messages/ posting comments (M=4.17); I can perform and collaborate to group activities (M=4.14); I feel confident in posting questions in online discussions (M=4.09); and I can easily navigate ICT tools utilized in learning (M=3.72). With a grand mean of 4.06, results imply that the electronics engineering students are somewhat ready in terms of online communication self-efficacy.

Part II. Feedback of Electronics Engineering Students on the Learning Management System in terms of Online Simulation and Microsoft Teams

The feedbacks of the electronics engineering students on learning management system.

2.1 Online Simulation

Table 6 shows the feedbacks of the electronics engineering students on online learning and learning management system in terms of online simulation.

Table 6 Mean Distribution on the Feedbacks of the Electronics Engineering Students on the Learning Management System in terms of Online Simulation

Statements	Mean	Interpretation
1. I feel comfortable with my knowledge and experiences in Engineering Laboratory using Online Simulation.	3.56	Somewhat Ready
2. I think that Online Simulation is a valuable tool in my training as an Electronics and Communications Engineer.	3.48	Somewhat Ready

3. I am aware of the challenges that are present in online simulation tools.	3.69	Somewhat Ready
4. The simulation provides realistic experiences.	3.59	Somewhat Ready
5. The steps involved in the simulation closely approximated a real performance situation.	3.72	Somewhat Ready
6. I am confident and presented myself the same way as I do in a real performance.	3.53	Somewhat Ready
Total Mean	***3.60***	**Somewhat Ready**

As shown in Table 6, the feedback of the electronics engineering students on online learning and learning management system in terms of online simulation is somewhat ready, specifically, in the following aspects: the steps involved in the simulation closely approximated a real performance situation (M=3.72); I am aware of the challenges that are present in online simulation tools (M=3.69); the simulation provides realistic experiences (M=3.59); I feel comfortable with my knowledge and experiences in engineering laboratory using online simulation (M=3.56); I am confident and presented myself the same way as I do in a real performance (M=3.53); and I think that online simulation is a valuable tool in my training as an electronics and communications engineer (M=3.48). With a grand mean of 3.60, the electronics engineering students are somewhat ready when in terms of online simulation.

2.2 Microsoft Teams

Table 7 shows the feedbacks of the electronics engineering students on online learning and learning management system in terms of learning management system.

Table 7 Mean Distribution on the Feedbacks of the Electronics Engineering Students on the Learning Management System in terms of Microsoft Teams

Statements	Mean	Interpretation
1. My interaction with an LMS (Microsoft Teams) is clear and understandable.	3.92	Somewhat Ready
2. I believe that it is easy to get an LMS (Microsoft Teams) to do what I want it to do.	3.56	Somewhat Ready
3. I believe that an LMS (Microsoft Teams) is easy to use.	3.89	Somewhat Ready
4. Studying through Microsoft Teams is a wide idea.	4.03	Somewhat Ready
5. Microsoft Teams provides an attractive learning environment.	3.76	Somewhat Ready
6. I am positive towards e-learning (Microsoft Teams).	3.58	Somewhat Ready
Total Mean	***3.79***	**Somewhat Ready**

As shown in Table 7, the electronics engineering students are somewhat ready in terms of learning management system in the following aspects: studying through Microsoft Teams is a wide idea (M=4.03); my interaction with an LMS (Microsoft Teams) is clear and understandable (M=3.92); I believe that an LMS (Microsoft Teams) is easy to use (M=3.89); Microsoft Teams provides an attractive learning environment (M=3.76); I am positive towards e-learning (Microsoft Teams) (M=3.58); and I believe that it is easy to get an LMS (Microsoft Teams) to do what I want it to do (M=3.56). With a grand mean of 3.79, the electronics engineering students are somewhat ready in terms of learning management system.

Part III. Online Learning and Learning Management System Contributions to the Readiness of the Electronics Engineering Students

Table 8 shows the contributions of online learning and learning management system to the readiness of the Electronics Engineering Students

Table 8 Frequency and Percentage Distribution on the Online Learning and Learning Management System Contribution to the Readiness of the Electronics Engineering Students

Statements	Frequency	Percentage
1. Positive Impression on Online Learning	12	40.0
2. Independent Learning	10	33.33
3. First- Hand Knowledge	8	26.67
Total	***30***	***100.0***

As shown in Table 8, 12 or 40.0 percent have positive impression on online learning, 10 or 33.33 percent are comfortable with independent learning and 8 or

26.67 percent experienced first-hand knowledge.

Part IV. Proposed Measures to Improve Readiness of Electronics Engineering Students to Online Learning and Learning Management System The researchers proposed measures to improve the readiness of Electronics Engineering Students to Online Learning and Learning Management System:

1. For computer/ internet self-efficacy to provide knowledge and skills to electronics engineering students on how to manage software for online learning, simple troubleshooting when internet problem occurs, as well as familiarize the terms used to relate to internet software. Teachers play a big role in every student's acquisition of learning.

2. For self-directed learning, electronics engineering students should have their own study plan, manage their time, seek assistance when facing learning problems and have high expectations for their learning performance.

3. For learner control, electronics engineering students should embody an attitude on directing their learning progress, learning at own pace and submit quality outputs, review online instruction materials based on their needs. Further, electronics students should stay calm and relax on whatever negative circumstances while learning online and avoid being distracted by other online activities when learning online.

4. For motivation to learn, electronics engineering students should be open to improving from their mistakes, sharing ideas with others and having the inner drive to learn and harness their potentials in learning ICT.

5. For online communication self-efficacy, electronics engineering students should learn to use online tools. They should be trained in expressing themselves through online text messages, posting comments and questions in online discussions and collaborate to group activities. In addition, they should be taught how to navigate ICT tools utilized in learning.

6. For online simulation, electronics engineering students should feel comfortable with knowledge and experiences in engineering laboratory subjects using online simulation. Online simulation should provide realistic experiences and that is a valuable tool in training electronics engineering students. In addition, there should be awareness of the challenges present in the online simulation tools.

7. For Microsoft Teams, there should be a clear and understandable interaction between the teachers and students using the LMS, that the LMS is easy to use and provides an attractive learning environment. Further, electronics engineering students should be positive towards e-learning.

IV. DISCUSSION

Part I. Level of Readiness of Electronics Engineering Students when it Comes to Online Learning

The electronics engineering students are somewhat ready with online learning in terms of computer/internet self-efficacy. Thus, this only means that the electronics engineering students already have adequate readiness level in the use of computer, as well as internet self-efficacy. Majority of the participants have knowledge and skills in using computer and internet which greatly helps them in their online learning.

With regard to the effect of internet self-efficacy in an online learning environment, four studies revealed that this is correlated with academic performance (Lynch and Dembo, 2004; Kitsantas and Chow, 2007; Yukselturk and Bulut, 2007; Joo et al., 2013), while two studies found no significant results (Crippen et al., 2009; Cho and Shen, 2013). Because all of the previous studies used the specialized content of a university/college course differently, the content cannot be used to explain the inconsistent results

The electronics engineering students are somewhat ready with online learning in terms of self-directed learning. Thus, the engineering students can carry out their own study plan, are able to seek assistance when there is learning problems, can manage their time well, have their learning goals and have high hopes in their learning performance. Majority of the electronics engineering students can learn on their own and at the same time can ask for assistance if necessary.

In the online learning scenarios where the structure of an online curriculum is mostly automatic (Khan, 2009), students have more flexibility in deciding when, how and with what content and activities they engage (Milligan & Littlejohn, 2014). This flexibility requires students to monitor and adjust their behaviour and actions concerning the specific learning context (Zimmerman, 2000). Students are aware of their learning responsibility in themselves instead of an external source, such as a teacher (Demir, 2015). A self-directed learner tends to actively engage in the learning processes, such as acquiring information, planning and evaluating the learning activities. Active learning strategies can increase students' participation and improve the learning process and performance (Freeman et al., 2014; Yilmaz, 2016).

The electronics engineering students are somewhat ready for online learning in terms of learner control. Thus, the data shows that participants can direct their own learning progress, is not distracted by other online activities, use online instructional materials to review, can learn at their own and is optimistic in any negativity while learning online. All participants have huge part in their online learning as they are the ones who control them.

Those who learn in web-based learning media have the opportunity to decide which information to access and how to order the information (Lawless & Brown, 1997), have more flexibility and more personalized means of learning (Lin & Hsieh, 2001). They have more control on their learning. Students' directing their self-learning experience and processes expressed as learner control (Shyu & Brown, 1992). Learner control has some potential threats like a lack of perception of control, making suboptimal choices and a high cognitive load on learners' processing resources influenced by the amount of choice available (Corbalan, Kester, & van Merriënboer, 2009).

Most of the electronics engineering students are very ready with online learning in terms of motivation for learning. Thus, this indicates that majority of the participants are open to innovation, has the motivation, able to learn from mistakes, share ideas and have the eagerness to unleash their potential in ICT.

Significance of motivation in education and on the achievements of the students is a well-known issue. Since the structure of online education programs is substantially self-directed, motivation is an important part of learning process in distant learning process as it is in conventional education (Khan, 2009) and it is a requirement for successful online learning (Lim, 2004).

The electronics engineering students are somewhat ready in terms of online communication self-efficacy. Thus, it indicates that all participants are confident in expressing themselves, asking questions and communicating online whether to an individual or group of people.

Online learning requires communications via computer and quality in learning experiences in this media, efficiency in learning activities, student interaction and active participation (de Bruyn, 2004). In a study conducted by Stephenson (2001), it was indicated that online interactive environments improve responsibility, critical analysis and reflection, and social structuring of information in students. Thus, online communications are important in online learning process. Online communication self-efficacy of individuals should be considered in removal of the limitations related to online learning.

Part II. Feedback of Electronics Engineering Students on the Learning Management System in Terms of Online Simulation and Microsoft Teams

Online simulations are very important to students with laboratory subjects to aid them in better understanding of the lessons being taught. The electronics engineering students agreed that online simulation is a great help in the delivery of laboratory subjects. The students were able to understand the principles better through the help of simulators which give a sense of a real performance situation. It was a great tool as perceived by electronics engineering students in their online learning environment to easily comprehend their technical subjects.

The participants are somewhat ready for the learning management system used in online learning. Thus, this only shows that Microsoft Teams are a big help to engineering students in their online learning. The use of a Learning Management System (LMS), Microsoft Team, is a factor to consider in determining the online learning readiness of the students. This study integrates the use of Microsoft Teams as the LMS of engineering students where the study is conducted.

Poston et. al (2020) argue that Microsoft Teams will be beneficial when it starts in a small class. It is in line with the finding in this study that a small class of 30 engineering students agreed that Teams is a big help in their online learning.

Part III. Online Learning and Learning Management System Contributions to the Readiness of the Electronics Engineering Students

The Online Learning and Learning Management System Contributions to Electronics Engineering Students are the following: positive impression on online learning, independent learning and first- hand knowledge.

Conclusion

Based on the findings of the study, the following conclusions were drawn:

1. The electronics engineering students are very ready to online learning in terms of motivation to learn. However, they are somewhat ready in terms of computer/ internet self-efficacy, self-directed learning, learner control and online communication self-efficacy.
2. The electronics engineering students are somewhat ready to learning management systems in terms of online simulation and Microsoft Teams.
3. The contribution of online learning and learning management system to the readiness of electronics engineering students are positive impressions on online learning, independent learning and first-hand knowledge.
4. A proposed measure of action was offered to improve the readiness of electronics engineering students to online learning and learning management system.

Recommendations

1. There is a need for the school administration to provide more learning opportunities for students to enhance their readiness to online learning and learning management system through the implementation of the proposed measures.
2. Teachers and parents are encouraged to guide their students and children in using the Microsoft Teams to truly learn how to properly use it in their studies, as well as allow interactive learning. Experience could be just as interesting and socially linked as classroom teaching.
3. A collaborative effort between the students and teachers is encouraged in order to build a smooth and firm relationship with each other and come up with positive learning outcomes which allows both to create collaborative class, participates in professional development groups, and network with peers all from one platform.
4. There is a need for future researchers to conduct similar study using the variables not covered in the present study.

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