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Vision and Mission of the IJODeL

Vision

To be a leading international academic journal that publishes and disseminates new knowledge and information, and innovatives best practices in open and distance electronic learning.

Mission

The IJODeL shall publish and disseminate new knowledge and information based on original research, book reviews, critical analyses of ODeL projects and undertakings from various researchers and experts in the Philippines, the ASEAN Region, and the world, and concept articles with the intention of presenting new ideas and innovative approaches to interpreting and implementing best practices in open and distance e-learning as alternative delivery mechanism for quality education.

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Editorial
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The University of the Philippines Open University (UPOU) started publishing its academic journal, The International Journal on Open and Distance e-Learning (IJODeL) in 2015. Our latest issue, Vol. 4, No. 2 (December 2018) has just been completed and shall be online shortly.

Why are we publishing this journal? There are many reasons we can cite why we are publishing this journal, but I wish to focus on the almost mundane. In the developing world, there are countless experiences in undertaking distance e-learning activities mainly because we have seen this approach as a reasonably efficient approach to mass education in our environment. True, we are following the examples from developed countries, but we in the developing world are engaged in distance e-learning for survival-type reasons rather than just merely employing innovations as experienced by others. When we employ innovative ways of providing mass education to the teeming millions in our country sides, we are talking of social survival of our children. In this process, we have amassed wealth of experience that have hardly been learned by our educational planners and experts. This is understandable because such experiences have not been put on the table for serious discussion. This is perhaps one of the most important reasons why we feel very strongly about getting our colleagues to talk about their experiences in pursuing innovative ways of educating huge masses of humanity in our part of the world. We are as certain about our colleagues in developed countries wanting to learn from our experiences in the developing world as we in the developing world would want to learn from the experiences in the developed countries. The best way to do this, for now, is to present our experiences to academics of the world in an academic journal. This is what we are doing at IJODeL.

This is an open invitation to our colleagues in the developing as well as developed world to send us your articles for publication consideration in IJODeL. Please refer to our article submission procedure for the IJODeL (toward the end of this issue).

Felix Librero, PhD
Chief Editor

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Impact of Virtual Reality in Maritime Education and Training: The Case of the Maritime Academy of Asia and the Pacific

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Abstract

The use of virtual reality (VR) in education is one of the revolutionizing strides in developing computer-assisted instruction. Through an elaborate literature review, the study tracked the development of VR in education and its progress in maritime education and training (MET) here and abroad. The research employed a case study analysis in assessing the impact of VR-based education juxtaposed with the traditional method of teaching. The two groups of students from Maritime Academy of Asia and the Pacific (MAAP) underwent two sets of tests which were the Diagnostic Test and the Assessment Test. Each set of tests was composed of 25 questions. The T-test was used as the analysis framework to determine whether there was significant difference between the two sample means. The two separate treatments (VR-based Teaching and Traditional Teaching) which were used in the experiment were two independent samples, were normally distributed, and had the same variance. The p value was less than 0.05; therefore, the null hypothesis that there was no significant difference between the two means of the VR-based Teaching and Traditional Teaching was rejected. The mean score of the VR-based Teaching was 20.84% while the mean score of Traditional Teaching was 10.44%. The primary advantage of VR-based teaching which emerged in the study was the ability of VR to engage the learners while infusing fun and excitement and to immerse them in experience that generally makes retention easier. Furthermore, majority of the students reported that given the option, they would utilize and recommend VR in their education and training. Overall, students reported positive experiences in using VR, specifically citing the realism that the VR head gears were able to replicate in the virtual environment. They study also found that simulation technology in education and training can deliver the desired competency among seafarers and safety in shipping vessels

Keywords: *Quality assurance, open and distance e-learning, learning visit/externship, knowledge sharing and co-creation*

Introduction

Many innovations that have revolutionized the way in education and training are being utilized in the maritime industry. The fast-paced progress of computational power has drastically changed trainings and assessments from the basic use of personal computers to the utilization of advanced simulations. To better fit these technological improvements, major revisions were made in the Standards of Training, Certification, and Watchkeeping (STCW) Convention and Code. A couple of notable major revisions were the addition of the following provisions: New requirements relating to training in modern technology such as Electronic Chart Display and Information System (ECDIS) and Introduction of modern training methodology including distance learning and web-based learning (IMO, 2010).

Such revisions on the STCW Convention and Code prompted many stakeholders in the industry to innovate and adopt new methods of training that will allow the seafarers to have an edge in the highly competitive industry. Acknowledging this need to adapt forced maritime education and training (MET) institutions to become more flexible and innovative in seeking ways to educate students; hence, the need to make education more accessible and learner-centric so that skills enhancement and knowledge development are neither restricted by physical spaces. With the advent of Virtual Reality (VR) technologies and distance learning, immersive learning experiences and better knowledge retention were achieved.

Despite the international recognition of the growing need for these innovative solutions, VR is only now being established as an emerging market in the Philippines. This may be attributed to the reality that the stakeholders may have little to no knowledge about the impact VR has on the performance of students and learners. There is limited literature that documents the progress of VR being incorporated in the country's education system; hence, the lack of traction in launching it in a much larger scale. Another explanation would be that there is a lack of VR content providers in the country that caters specifically to the needs of maritime institutions. With this in mind, the researchers recognized the need to study the impact of VR in education by providing empirical data on its actual use to create better understanding of its worth in maritime education.

Rationale of the Study

The Philippines' maritime educational system employs outcome-based education (OBE). It is an educational theory that requires components of an education system to be grounded on goals that must be achieved. The OBE theory requires that all efforts (i.e., classes, instructions, assessments, etc.) must all yield the desired results. The theory does not state specific methods and is only concerned with meeting the objectives of education. Outcome-based learning allows clarity of and focus on goals thus prohibiting unnecessary deviations from the topic. Flexibility is also put at a premium as the need to prioritize the needs of the students is emphasized; hence, OBE is coined as 'student-centered learning'.

OBE grounds the methods of teaching in the Maritime Academy of Asia and the Pacific (MAAP) and every other maritime educational institution in the country. However, despite the intentions of OBE, the question on whether the country's MET is delivering quality seafarers has been presented.

Over the years, the country's MET has been marred with issues of deficiencies in declining employment of Filipino seafarers. The Nordic Chamber of Commerce of the Philippines reported a decline by 25% (Guerrero and Cahiles-Magkilat, 2018). One of the factors cited for the decline was the educational gaps in Philippine's MET as audited by European Maritime Safety Agency (EMSA). EMSA identified gaps in the country's compliance to STCW Convention and Code which outlines the minimum requirements for officers, masters, and watch personnel in vessels. The country is given until October of the year 2018 to come up with proof that the issues are being address by the government. If still found to be non-compliant, 80,000 Filipino seafarers are threatened to be displaced and become unemployable by European Union (EU) member states. There arises the need to integrate modern technology, as mandated by the 2010 Manila Amendments of STCW Convention and Code, in the country's education to significantly impact the quality of seafarers produced locally to make them more competent and globally competitive.

Objectives of the Study

Primarily, the study, through a comprehensive literature review, aimed to track the development of VR in general and its progress in MET in the global and local scene. Piecing together the development through its varied applications in various fields, the researchers aimed to establish the advantages of VR in education.

Secondly, the research employed a case study analysis in assessing the impact of VR-based education juxtaposed with the traditional method of teaching. The researchers aimed to accomplish this by measuring the academic performance of two sets of students (VR –based Teaching Group and Traditional Teaching Group) through their test scores before and after going through the designed teaching session. The study focused on comparing the impact of both VR-based Teaching and Traditional Teaching on the students' test scores and their memory retention.

More specifically, the study aimed to assess the impact of VR when used in maritime education using a case study done among students from MAAP. The study determined if there is a significant difference between the performance of students who undergo VR-based teaching and traditional method of teaching.

Review of Related Literature

Virtual Reality's Definition and Applications

VR's defining characteristic is the navigational and immersive experience it provides its user/s (Rheingold, 1991). According to Rheingold (1991), immersion in VR technology pertains to VR's ability to replicate an environment from the real world while navigation is the ability of any user to manipulate the objects present in that environment. Precisely because of these definitive features, VR discovered its place in the educational setting.

Several fields of study have employed VR technology in education. Some of these fields are more often exposed to high risk scenarios; hence, the high value placed in reducing human error in execution. In the study of medicine, Scalese, Obeso, and Issenberg (2008), noted that simulations are used by medical practitioners through computer representations of physical body parts. Through virtual simulations, medical professionals can practice and master the procedures that they need to perform on their patients with the aim of reducing errors in operations. The medical field has since expanded the application of VR and has recorded advantages in terms of eliminating the need for live patients, reducing costs, and upholding various ethical considerations. Further applications involved testing competencies and medical knowledge of medical students. One research adopted this technology in designing and implementing a medical outreach workshop. Findings showed that through VR technology, students' aspirations to pursue medical degrees were heightened as they were able to immerse and have a feel of how medical professionals work (Tang, Maroothynaden, and Kneebone , 2013). With this, VR's practical applications in the medical field had widespread implications and inspired adaptations in other fields.

Virtual Reality Society (2015) gave other applications of VR in education and training in the military context which included flight simulations, medic training, battlefield simulations, and vehicle simulations. VR trainings are conducted with head-mounted gears that allow interaction among the trainees. With these, the military can simulate combat scenarios. The main advantages identified from VR application in the military are better cost efficiency and eliminated or reduced exposure to actual danger such as deaths and injuries and property damage.

Virtual Reality's Application in Maritime Education and Training

Tan (1999) studied the feasibility of using VR in MET highlighting the advantages of VR as a form of simulation. An example which the author cited was the Canadian Navy with its Maritime Surface/ Subsurface Virtual Reality System (MARS/VRS). The system was developed to enhance training performance through its 3D imaging, voice recognition, speech synthesis, and artificial intelligence features. Eades as cited by Tan (1997), emphasized the advantages of VR namely: portability, affordability, high flexibility, and ease of use. In the same study, Eades (1997) attested that the effectiveness of using head-mounted VR gears in training were subject to 'proof of concept' when they tested for the results with trainees registering 25-30% increase in their scores after having undergone the VR-based education.

Results and Discussion

Preparation

The preparation phase consisted of Course Development, Selection of Participants, and Pre-Testing. Course Development ensured that the content and design of the subject were delivered within the time allotted. Time allotment for both methods, VR-based Teaching and Traditional Teaching, was controlled. Pre-testing was done to test the procedures before running the experiment. Questionnaires were screened to ensure that the time allotment sufficed.

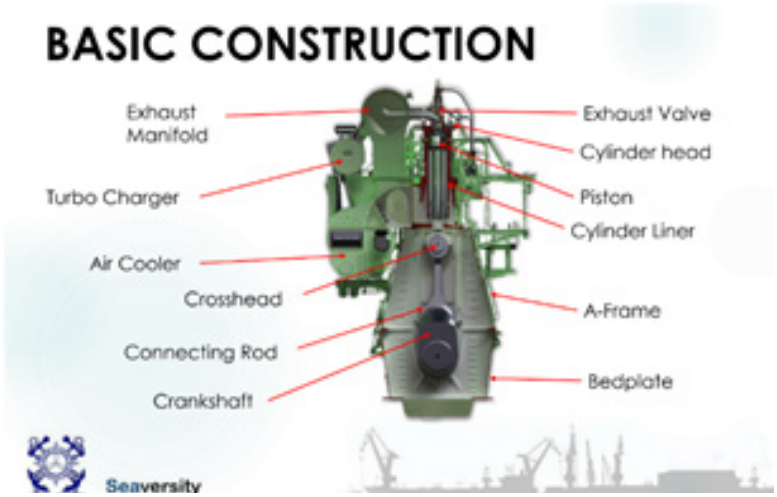


Figure 1: Sample content of ME Engine discussion

Course Objectives

Course Objectives were based on the module provided by MAAP which served as basis for materials such as PowerPoint presentation and VR content developed by the researchers. The VR content was run and powered by Unity. The questionnaires for both the two sets of tests administered were checked and validated by maritime instructors.

Figure 2: Course Content discussed in both VR-based and Traditional Teaching

The course objectives outlined for the teaching session conducted were as follows:

a. identified and locate principal components of ME Diesel Engine;
b. distinguished the advantages of ME engine from MC engine;
c. understood the basic construction of ME type engine; and
d. explained the difference between ME diesel engine and MC diesel engine in terms of parts and features.

These objectives were reflected on the questionnaires developed for both the Diagnostic and Assessment Test.

Table 1: Research procedures for study on effectiveness of VR-based and traditional teaching among BS MT students in MAAP

Preparation	Testing Proper					Analysis
Course Development Selection of Participants Briefing Informed Consent Profile	Traditional Teaching	Diagnostic Test	Traditional Teaching	Assessment Test	VR Use Attitude Survey	Results
	VR-Based Teaching	Diagnostic Test	VR Instruction and Training	Assessment Test	Attitude Survey	

The study employed two methods in assessing the impact of incorporating VR technology in maritime education. The quantitative part measured the performance of the students using their test scores while the qualitative part utilized the feedback on VR use based on the students' attitude and perception towards VR's application in education.

Statistical Analysis on Performance of Students

Two classes of first year Bachelor of Science Marine Transportation (BS MT) students from MAAP were screened and selected for the study. The two classes were ensured to have similar characteristics in terms of level of initial knowledge about a ship's ME Engines. Class A was composed of 19 students while class B was composed of 18 students. For the purpose of the study, Class A was assigned to undergo the VR-based type of teaching while Class B, the control group, was assigned to undergo the Traditional type of teaching.

The two groups underwent two sets of tests which are the Diagnostic Test and the Assessment Test. Each set of test was composed of 25 questions. Ten questions from the Diagnostic Test were retained in the Assessment Test. To assess the effect of the two different methods of teaching on the performance of the students, the percent increase in their scores were noted and tabulated below.

Table 2: Test scores of participants under VR-Based and Traditional Teaching

Treatment 1 VR-Based Teaching		**Treatment 2 Traditional Teaching**	
Student n=19	**Test Score % Increase**	**Student n=18**	**Test Score % Increase**
1	10	1	29
2	20	2	10
3	40	3	15
4	15	4	24
5	20	5	20
6	15	6	-5
7	15	7	5
8	20	8	20
9	20	9	5
10	10	10	25
11	19	11	10
12	29	12	-19
13	19	13	25
14	14	14	5
15	20	15	5
16	20	16	0
17	14	17	29
18	10	18	-15
19	66		

Statistical Analysis

The T-test was used as the analysis framework to determine whether there was significant difference between the two-sample means. The two separate treatments which were used in the experiment ware two independent samples, ware normally distributed, and had the same variance.

Null Hypothesis

The null hypothesis was there was no significant difference between the means of the two populations. Using a two-tailed test hypothesis and significant level of 0.05, t and p values were computed.

Ho: u1-u2 =0,
Where: u1 = the mean of the first population
u2=is the mean of the second population

Equation

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\left(\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

Figure 3. T-Test statistic equation
(Source: Social Science Statistics)

Advantages of VR-based Education

The p value was less than 0.05; therefore, we rejected the null hypothesis that there was no significant difference between the two means of the VR-based Teaching and Traditional Teaching. The mean score of VR-based Teaching was 20.84% while the mean score of Traditional Teaching was 10.44%. The average test scores of the class with VR technology incorporated in learning was relatively higher than that of the Traditional learning.

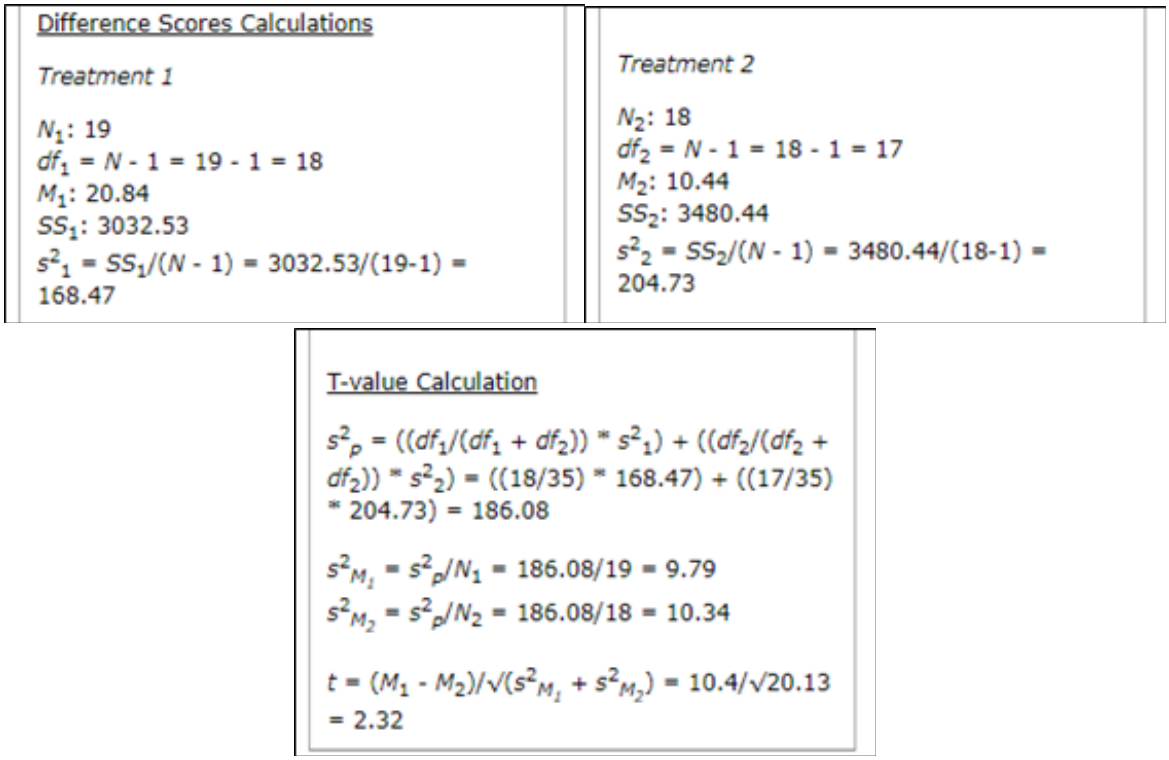
The higher average test score of the first group suggested that VR-based teaching helped improve the students' performance as evident in the 10.40% gap between the two groups' mean scores. This also suggested that the VR-based teaching method helped in improving students' retention of new information. The objectives of the course discussed in both types of treatment which were reflected in the test questionnaires included familiarizing with the ME Diesel Engine, distinguishing advantages of ME engine from MC Engine, and differentiating the parts of ME and MC engine. To gain mastery of the parts of the ship, the students must be able to visualize the parts as they appear in the actual engine which VR successfully replicated and demonstrated complete with dimensions, functions, and dynamics based on real-life scenarios.

Table 3: VR-Based Teaching Group
(Source: https://www.socscistatistics.com/tests/studentttest/Default2.aspx)

Treatment 1 (*X*)	*Diff* (*X* - *M*)	*Sq. Diff* (*X* - *M*)^2
10	-10.84	117.55
20	-0.84	0.71
40	19.16	367.02
15	-5.84	34.13
20	-0.84	0.71
15	-5.84	34.13
15	-5.84	34.13
20	-0.84	0.71
20	-0.84	0.71
10	-10.84	117.55
19	-1.84	3.39
29	8.16	66.55
19	-1.84	3.39
14	-6.84	46.81
20	-0.84	0.71
20	-0.84	0.71
14	-6.84	46.81
10	-10.84	117.55
66	45.16	2039.24
	M: 20.84	SS: 3032.53

Table 4: Traditional Teaching Group
(Source: https://www.socscistatistics.com/tests/studentttest/Default2.aspx)

Treatment 2 (*X*)	*Diff* (*X* - *M*)	*Sq. Diff* (*X* - *M*)^2
29	18.56	344.31
10	-0.44	0.20
15	4.56	20.75
24	13.56	183.75
20	9.56	91.31
-5	-15.44	238.53
5	-5.44	29.64
20	9.56	91.31
5	-5.44	29.64
25	14.56	211.86
10	-0.44	0.20
-19	-29.44	866.98
25	14.56	211.86
5	-5.44	29.64
5	-5.44	29.64
0	-10.44	109.09
29	18.56	344.31
-15	-25.44	647.42
	M: 10.44	SS: 3480.44



The t-value is 2.31735. Th p-value is 0.026456. The result is significant at $p<0.05$.

A general higher improvement in the scores showed proof that the students benefited from the use of VR compared to the other group who did not experience VR before the assessment test. The deviation in the mean scores implied that VR-based education was more effective in achieving the outcomes desired for the teaching demonstrations.

Concerns about Virtual Reality and Future Use

All the participants were provided the opportunity to experience VR using the ME Engine Familiarization module. To ensure the validity of the test, the control group was allowed to try the VR headset only after their Assessment Test. A total of 37 students composed of 35 (94.6%) males and 2 (5.4%) females took the survey placed before and after undergoing their designated ME Engine Teaching session.

Majority of test subjects had little exposure and knowledge about VR technologies and only about half of them used VR at least once. When asked about their source of VR content, 54.1% indicated YouTube and 18.9% indicated Google Expeditions. These sources were the ones most accessible to the users.

Figure 4: Familiarity with VR technology

The participants were also asked about their initial concerns about VR and possibility of future use. When asked about whether they expected to use VR in their education in the near future, 91.9% indicated that they had expectations of using said technology for their learning while 8.1% were unsure.

The researchers also included questions on their perceived benefits of VR in education and possible concerns on its use. The top benefits identified are Lessons are made easier to grasp (56.8%); Lessons can be accessed anytime (37.8%); Students can determine own pace (29.7%); and Students are excited about the lessons (29.7%).

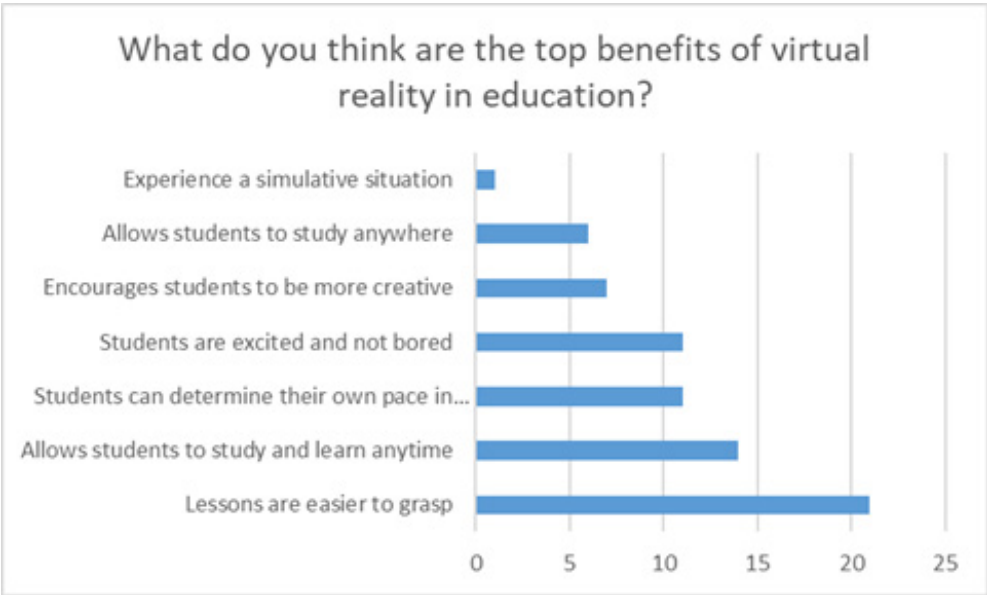


Figure 5: Top benefits of VR in education

The advantages of VR included the interactive and immersive environment where students can simulate real-life environments (e.g., see the parts of engines, assemble the parts of engine, 360-degree virtual tour of to-scale ship, etc.). Some students indicated that it is usually very difficult to visualize the parts of the ship as some of their lessons provided only theoretical discussions and visualizations, limiting their comprehension on the subject matter. Another top benefit indicated was the accessibility of the lessons. With the presence of VR-enabled tools, students easily familiarized themselves with the environment whether they are inside or outside their classrooms. One advantage also cited was the self-determined pace of lessons as the students easily navigated through the material without affecting the progress of other students. Finally, students indicated that VR infused excitement through gamification of the lessons which caught and engaged their attention.

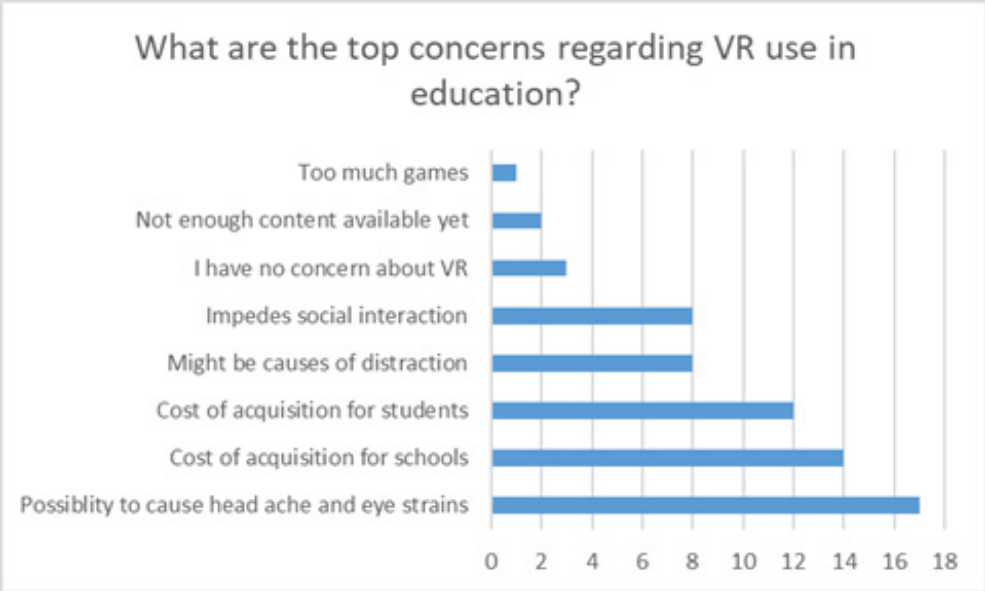


Figure 6: Top concerns for VR use in education

Possibility of eye strains and headaches, cost of acquisition for schools, and cost of acquisition for students were identified as the top three concerns of the survey participants. VR head gears are part of the equipment which have to be acquired by schools from any VR supplier.

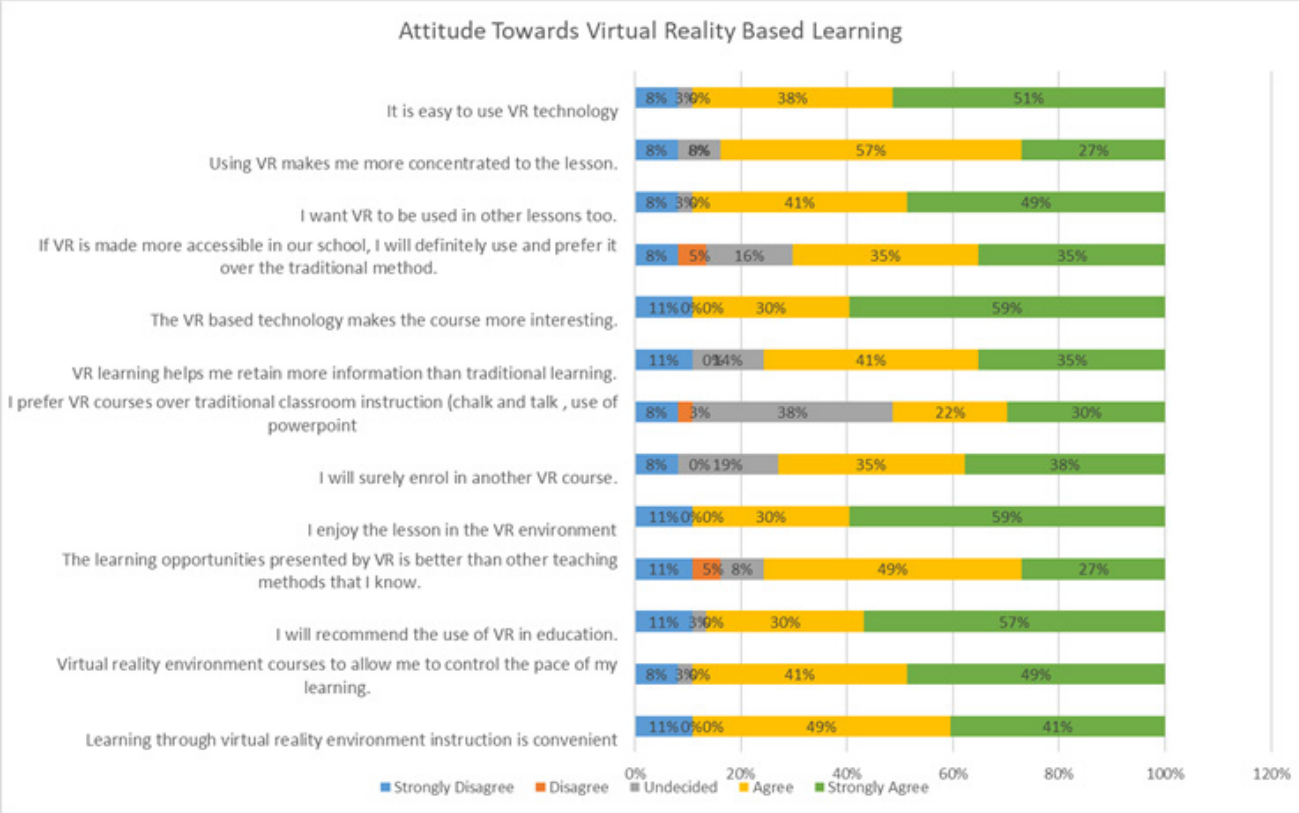


Figure 7: Results of survey on attitude towards VR use in education

The survey on Attitudes Towards VR-based Learning was conducted after the participants were able to try out the VR content using the VR head gear. The survey questionnaires included topics on usability of VR, receptiveness to lessons due to VR, willingness to recommend VR use to peers, and willingness to use VR in the future.

Virtual Reality Usability

Participants indicated strong agreement on the ease of use (Agree:38%, Strongly Agree:51%) and convenience of VR (Agree:49%, Strongly Agree 41%). Using the VR controllers, the students did multiple tasks in the virtual environment. The VR environment was also voice-activated, allowed for elaborate movements, and allowed users to navigate the place and manipulate objects within the environment. The simulations were replications of real-life scenarios in ships and may be used for maritime trainings and assessment.

Knowledge Retention, Concentration, and Willingness to Use

VR-based Teaching made the lessons more interesting compared to other methods of teaching (Agree: 30%, Strongly Agree:59%) and it increased attention and concentration of students on the subject matter being tackled (Agree: 57%, Strongly Agree: 20%). Moreover, students expressed their desire to use VR in other subjects as well (Agree: 41%, Strongly Agree: 59%). Participants strongly agreed that given the option, they preferred the use of VR in education over other methods and expressed that VR can supplement the traditional style of teaching (Agree:35%, Strongly Agree: 35%). Most have expressed that both methods can be combined to supplement one another in terms of enhancing knowledge retention of students. Almost 90% of the participants expressed

intention to use VR again in their education and strongly recommended its use to their peers.

Qualitative Feedback on VR Experience

At the end of the Attitude Towards VR Survey, two open-ended questions were posted. The first open ended question asked the participants 'How was your VR experience?". All the students gave positive feedback expressing excitement towards and high interest in the use of VR. Majority thought of the experience as immersive in a sense that they were able to navigate through the parts of the engine and the ship as if it were happening in real life. Some found the experience memorable as it reinforced theoretical knowledge they had about the engine.

"My VR experience interesting because I never thought that I will learn through virtual reality. It is a very good example of a new technology nowadays because you can visualize on what you will want to see if you don't have it in real life, you can see what you want through virtual reality. For example, I can see the Main engine and how it big even though we are not in a ship. Because of Virtual Reality we can see the engine and the parts of it. We can see also in 360 degrees and we can transfer to one place to another."

"It was a good experience although it's not my first time. Suddenly I realize it can really be a big help when it comes to education. For example, in a ship board familiarization you can familiarize a vessel and its parts even though you are not in a real vessel."

"It was a great experience, indeed. It helps to boost my interest in this field of work and excites me more for the future ahead. Virtual Reality creates environment that would satisfy the need to learn through experience."

"It was immersive. I really felt that I was in front of an engine of a ship. in terms of education, I think it made me more engaged to the topic and it really catches my full attention. It made the subject more interesting compared to the boring slides in a presentation. I think it really helped that the engine presented was the actual size because usually when presenting a PowerPoint, the size of the engine is limited to the size of the screen"

"The VR experience was really nice and thoughtful, because we are able to see the real size of a ship engine that really open my eyes that we are dealing with a very big machine in the ship. This experience would be memorable because we are able to be in a ship even though we are inside the academy."

The second open ended question prompted the survey participants to think of possible applications of VR. Recurring answers included education, training, distance learning, ship engine familiarization, safety scenarios, trainings, games, rehabilitation, and medical application to name a few.

"If the school lacks facilities, they can just use VR in order to simulate the work environment needed for a specific practicum."

"It can be used in teaching students. It is a more effective medium of teaching since it offers an actual or real-life image of a particular topic."

"Education, Simulator, Games, Medical (Rehabilitation, Medical Operation Simulations)"

"From entertainment to academics, I think VR has a lot of possible applications. With the help of VR, teaching will be convenient compared to the traditional one (using chalk and board). With the help of VR, learning will literally be exciting and fun."

"VR can really help Maritime schools simulate a real ship even inside the schools, VR can be used to show the real size of a machinery to a student, show how big a ship is etc. I think this is applicable for those maritime schools who wants to teach students how a ship really looks like even if they don't leave the school."

"Ship familiarization, Bridge Desktop Simulators and Engine Desktop Simulators"

"It can be used in many different ways: familiarization of the ship, studying the ColRegs, specifically the lights and shapes, buoys, and more. There are lots of possible applications in this."

The most recurring or salient theme was the desire to use VR in education and the interest in its possible applications in MET. During the demonstration of the engine with the use of VR, students exhibited awe in the visuals that they saw using the VR head gears. Participants were enthused in using VR and some students who were actually drawn to the ship's edges were shocked as the actual depth is reflected in the virtual environment. The immersiveness in the virtual environment made their experience memorable and the knowledge of the engines' parts that they gained were retained more effectively.

Conclusions

The purpose of the study was to determine the impact of VR-based education on the academic performance of students from MAAP and to learn how receptive they are of the technology. Results showed that there was a significant difference in the effectiveness of the two teaching methods (VR-based and Traditional Teaching) with the VR group averaging twice the mean score of the Traditional group. Using T-test statistical analysis, the t-value and the p-values were computed resulting to the rejection of the null hypothesis; hence, a significant difference between the mean scores of the two groups was noted. Majority of the students reported that given the option, they would utilize VR in their education and recommended its use in education. Overall, the students reported positive experiences in using VR, specifically citing the realism that the VR head gears were able to replicate in the virtual environment. Simulation technology in education and training can deliver the desired competency among seafarers and safety in shipping vessels.

The primary advantage of VR that emerged in the study was its ability to engage and immerse the learners in a fun and exciting learning experience that generally makes knowledge retention more effective. The effectiveness of VR in this case study was not generalizable as only few samples were taken for both studies. This study can be improved by increasing sample sizes and taking sample maritime educational institutions. This study was found to be effective in determining the effectiveness of VR-based teaching through assessing the knowledge level of students. The study also found evidence that there is still lack of awareness about the use of VR in MET and noted concerns of students on the accessibility of VR devices and content. This study found that overall VR-based instruction is quite effective in enhancing learning outcomes.

Further studies can be designed to test more variables and may incorporate various VR tools (e.g., gamification, desktop-based, etc.). It is also recommended to test the achievement levels of students using knowledge-based, abilities-based and skills-based measures as this study was only limited to knowledge-based measures.

VR application in MET provides great promise for Filipino seafarers and the entire maritime industry. The impact of VR-based learning and teaching may prove useful in developing excellent and highly competent maritime professionals.

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Appendix

Truly Informed Consent

Good day! We are a group of researchers under Seaversity, a technology enabler company working with Virtual Reality as a tool used in education and training in the maritime industry. We are conducting a study on the use of Virtual Reality-based teaching in maritime education.

In this regard, we would like to invite you to partake in a short survey and experiment which aims to assess the impact of VR in Education.

The survey aims to learn the attitude and perception of students with regards to the use of virtual reality technology in education. The survey also aims to gather the thoughts and insights of students from the VR experience that the experiment provided.

Participants' Certification

I have read and fully understand the informed consent document clause. I believe and understand the purpose of research study and what instructions I will be asked to do.

I hereby give my informal and free consent to be a participant in the research study.

I also understand that in taking part in the study, I will be required to provide my name, age, year level and school information. I also understand that I have the right to withdraw from the experiment should I wish to. I also understand that I can have my information modified and erased form the researchers' database should I wish to.

_____

Signature Over Printed Name/ Date

VIRTUAL REALITY IN EDUCATION SURVEY

1. Name: _____
2. Age: _____
3. Year Level and Course: _____
4. School: _____
5. School Address:_____
6. Which of the following describes your institution?
   - Primary
   - Secondary
   - Tertiary (College/University)
   - Training Center
   - Other (Please Specify) _____
7. What is your role or function in the organization/institution?
   - Faculty
   - Administration
   - Student
   - Other (Please Specify)_____
8. How familiar are you with Virtual Reality (VR)?
   - I am not aware of VR
   - I am slightly aware about VR
   - I have used it once or twice before.
   - We plan to use VR.
   - We are already using VR.
9. Have you tried VR in school or in training centers?
   - Yes, I have tried VR in a school setting.
   - No, I haven't tried in a school setting.
10. In what subject area/s have you used VR? _____
11. Please describe your experience._____
12. What do you think about VR being used in education?
    _____

13. Which VR brand have you used?
    - Google
    - Samsung
    - Oculus
    - Hololens
    - Meta
    - Magic Leap
    - Not sure/don't recall the brand
    - Other (Please Specify)

    _____

CONCERNS ABOUT VR AND FUTURE USE

14. How often do you use VR in your school?
    - My school/training center has never used VR
    - I am not aware if my school/training center uses VR
    - My school/training center uses VR regularly (at least once a month)
    - My school/ training center sometimes uses VR (less than a month)

15. Do you expect or plan to use VR in the future
    - Yes, I plan or expect to use VR in the future
    - No, I don't have plan or expect to use VR in the future
    - I am not certain

16. What do you think are the top benefits of virtual reality in education? (Please choose top 2.)
    - Allows students to study and learn anytime, anywhere
    - Provides an immersive experience for students
    - Lessons are made easier to grasp
    - Encourages students to be creative
    - Students are less distracted with VR
    - Students can determine their own pace in learning through VR
    - Students are excited and not bored
    - Other (please specify) _____

17. What do you think are the top concerns regarding VR if used in education?
    - Possibility to cause headaches, eye strains, and other health concerns
    - Expensive for students to afford
    - Expensive for school to acquire
    - Too hard to operate during class
    - Too much games
    - Not enough content available yet
    - Might be cause of distraction

- ☐ Impedes social interaction and collective learning
- ☐ I have no concern about VR
- ☐ Other (Please specify)_____
- ☐

18. What source of VR content have you seen in the past?
    - ☐ Google Expeditions
    - ☐ Samsung Milk
    - ☐ Open Educational Resources (OER)
    - ☐ YouTube
    - ☐ Netflix
    - ☐ Oculus Video
    - ☐ Nearpod
    - ☐ None
    - ☐ Other (please specify)

A Survey on the Attitude Towards Virtual Reality Based Learning

Please encircle the statement that corresponds to the statement which you agree upon. Put a check on the likert scale.

	Strongly Disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly Agree 5
1.Learning through virtual reality environment instruction is convenient	☐	☐	☐	☐	☐
2.Virtual reality environment courses to allow me to control the pace of my learning.	☐	☐	☐	☐	☐
3. I will recommend the use of VR in education.	☐	☐	☐	☐	☐
4.The learning opportunities presented by VR is better than other teaching methods that I know	☐	☐	☐	☐	☐
5. I enjoy the lesson in the VR environment	☐	☐	☐	☐	☐

6. I will surely enroll in another VR course.	☐	☐	☐	☐	☐
7. I prefer VR courses over traditional classroom instruction (chalk and talk, use of powerpoint presentation, etc.)	☐	☐	☐	☐	☐
8.VR learning helps me retain more information than traditional learning.	☐	☐	☐	☐	☐
9.The VR based technology makes the course more interesting.	☐	☐	☐	☐	☐
10. If VR is made more accessible in our school, I will definitely use and prefer it over the traditional method.	☐	☐	☐	☐	☐
11. I want VR to be used in other lessons too.	☐	☐	☐	☐	☐
12. Using VR makes me more concentrated to the lesson.	☐	☐	☐	☐	☐
13. It is easy to use VR technology.	☐	☐	☐	☐	☐

Reflection on Learner Support Services and Scope of Web-based Services under Distance Education: A Case Study

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Abstract

Quality learner support system (LSS) is one of the important components for successful completion of an educational programme under the open and distance learning (ODL) system. The use of Web-based technologies is encouraged to supplement LSS as it provides an important link between the teachers and students for knowledge and skills transfer and enhances interaction between teachers and learners and amongst learners themselves. This paper examined the types and extent of learner support services used by learners of a distance education programme along with difficulties encountered by the learners in completion of the programme. Awareness about the Web-based learner support services and perception on the utility of the Web-based LSS were included in the paper. The paper presented the opinion of the learners about requisite Web-based learner support services and their willingness to pay (WTP) for such support system under the ODL system. The study was conducted using an online survey method. The data were collected from the learners of the Post Graduate Diploma in Food Safety and Quality Management (PGDFSQM) programme which is being offered by the School of Agriculture, Indira Gandhi National Open University, New Delhi, India. The study revealed that LSS helped in successful completion of the programme under the ODL system. Further, those learners who used the Web-based support services were more successful in completing their studies. The study found that considerations for laptops and smart mobile phones should be made in the design of the Web-based support system since most of the learners had access to these devices. The expenditure on development of Web-based LSS could be met by charging the learners additional fees. The Web-based LSS, as suggested by the learners, has potential to resolve the constraints in completion of the programme under the ODL.

Keywords: *open and distance learning, Learners Support Services, Web Technologies, Online*

Introduction

Learner support system (LSS) plays a vital role in distance education. The regional centers and the study centers of the distance education institutions provide academic and administrative support to the learners to achieve their academic goals. According to Keegan (1980), there is no significant separation between teacher and learner in the teaching-learning process which differentiates open and distance learning (ODL) from conventional education. The learners who are pursuing their academic programmes through ODL systems are located in different places of the country and are heterogeneous in nature. Since learners do not physically interact with the teacher, they get support from self learning materials, occasional face-to-face counseling, and comments from assignments. During the process of learning, most of the learners expect motivation from the teachers. In the conventional system, learners get motivation from the teachers in every step of their learning; where as in ODL system, learners get the motivation from LSS. LSS helps facilitate learning throughout the learning process. The ODL system utilizes LSS so that each and every learner receives guidance before, during, upon, and even after completion of the course and support in terms of career counseling and lifelong learning. LSS is very much essential for practice-

based programmes which include practical tests, laboratories and field work. According to Tait (2003) and Usun (2004) it guides the learners through the programme by providing pedagogical, administrative, psychological, and technological support.

Indira Gandhi National Open University (IGNOU) provides learner support services through a three-tier structure. At the bottom level, study centers are established at the conventional universities or institutions for the provision of academic and practical counselling. At the middle level, the University has established 67 regional centers at major cities of the country that coordinate activities of the study centers and conduct and manage the admission and examination of the learners. At the top level, the headquarters of the University provides and coordinates all facets of the learner support services. The study materials and multimedia components are prepared in the University headquarters and dispatched to the learners. Teleconferencing support is also provided to learners from the headquarters. Innovation in Web technology has great potential to support and supplement learner support services under ODL (Anderson, 2003).

Web technology has great scope in strengthening the learner support services in ODL (Chatpakkarattana and Khlaisang, 2012) since ODL universities and institutions mostly operate online (admissions, study materials, academic counselling by the University teachers, submission and evaluation of assignments, project management, examinations, to updating and declaring of results, etc.). It facilitates interaction between and among the learners, their peers, and their teachers (Krauth & Carbajal, 2000). Another advantage in using Web technology in LSS is that it allows learners, teachers, and institutions to measure up to the aggressive penetration of digital devices and Internet in society which makes ODL learners naturally well-versed with the use of Web technology. Also, the learners of the professional courses under ODL do not have sufficient time for their studies since they are mostly employed compared to the learners of the conventional universities who are full time students. Therefore, ODL institutions need to develop a support system which is flexible enough to cater to the needs of its learners while still upholding quality education and learning.

Objectives

The objectives of this study were:

1. to study the learner support services being used by learners of a distance education programme;
2. to integrate the Web-based technologies in LSS to effectively serve the learners under the ODL system;
3. to find out the digital devices that the learners are using and will be using to avail of learner support services;
4. to analyze essential components of Web-based LSS which can be suitable for the learners; and
5. to determine learners' willingness to pay (WTP) for Web-based LSS.

Methodology

The researchers designed and developed a structured questionnaire and had it validated by the experts in the field. The components of the questionnaire included demographic status, programme completion details, learner support services, counseling, Web-based support services, use of digital devices, and WTP for Web-based learner support services. The questionnaire was administered through Qualtrics an online survey tool to 550 learners of Post Graduate Diploma in Food Safety and Quality Management (PGDFSQM) programme who received learner support services from the study centers of IGNOU. Out of 550 learners,168 responded to the online questionnaire. The responses of 112 learners were analyzed. Microsoft Excel was used for analysis.

Results and Discussion

Socio-economic Profile of the Learners

Data on socio economic profile of the learners is given in Table 1. Most of the learners (about 46%) enrolled in PGDFSQM were between 26-30 years of age. Learners of this age, in general, searched for employment and chose this programme with a perception that it will help them get the job. The programme was also quite popular among the learners above 30 years of age . They chose this programme to help them in career promotion as 96% of the learners from this age group were employed. The programme was popular among both genders (male and female). The maximum enrolment was from general category learners (about 56%) followed by other backward caste, schedule caste, and schedule tribes. The programme was popular to both young and old learners. About 51% learners who enrolled in this programme were taking their masters degree and about 35% learners were taking the graduate degree. There were a few learners (4.59%) with a research degree (Ph.D./M.Phill). This programme is basically for science discipline learners and, but there were a few learners who had their Master degree in the management discipline.

Table 1: Socio-economic profile of learners

Particulars	Number of learners	Per cent
Age (n=109)		
Up to 25 years	14	12.84
26 to 30 years	50	45.87
31to 35 years	20	18.35
36 to 40 years	14	12.84
Above 40 years	11	10.09
Average age (in years)	31.05	
Gender (n=111)		
Male	69	62.16
Female	42	37.84
Category (n=110)		
General	62	56.36
Other Backward Caste	41	37.27
Schedule Caste	6	5.45
Schedule Tribes	1	0.91
Highest Education (n=109)		
Ph.D./MPHIL	5	4.59
M.Sc./M.Tech	48	44.04
MBA	8	7.34
B.Sc. /BTECH	38	34.86
PG Diploma	11	10.09
Employment status (n=109)		
Learners employed	96	88.07
Learners not employed	13	11.93
Learners (upto 30 years age) employed (n=62)	51	82.25
Learners (above 30 years age) employed (n=45)	43	95.56
Work experience (n=84)		
Up to 2 years	19	22.62
3-5 years	31	36.90
6-10 years	14	16.67
Above 10 years	20	23.81
Average work experience (Years)	7.07	Standard deviation: 6.27
Approximate Salary / income in INR per month (n=83)		
Less than Rs. 25000	60	72.29
25000-50000	15	18.07
50000-75000	6	7.23
More than 75000	2	2.41
Average salary	25508	Standard deviation: 18604

n=Number of learners reported

The majority of the learners (88%) were employed, which exhibited the importance of the programme in career building and continuing education. The average work experience of learners was found to be 7.07 years. About 37% learners had work experience between 3-5 years and 23% learners had work experience up to 2 years. About 24% learners had work experience of more than 10 years. This indicated that learners enrolled in this programme were professional adults. The average salary of the learners was INR 25508.00 which was quite a good salary at the time of enrollment in the programme. The majority of the learners (72%) were earning less than INR 25000, followed by 18% learners in between INR 25000-50000.

Completion Status of the PGDFSQM Programme

The programme was successfully completed by 40% male learners and 27% female learners at the time of survey. The male learners secured 72.13% marks and female learners secured 70.24% marks. About 57% male and 68% female learners were continuing the programme towards successful completion. The level of dropouts was at 3% in the case of male learners and 5% in the case of female learners. The dropout learners reported that change of work place, exceeding the maximum period of programme, inability to attend the classes, and pressure from the job were some of the major reasons for non completion of the programme (Table 2). Pierrakeas and colleagues (2004) reported that the major reason for dropout includes the learners' erroneous evaluation of the amount of time available due to professional workload and the actual amount of time needed for completion of the programme of the study.

Table 2: Programme Completion Status

Number of learners	Male (n=67)	Female (n=41)	Overall (n=109)
Number of learners completed the programme	27 (40.30)	11 (26.83)	39 (35.78)
Number of learners not completed the programme	40 (59.70)	30 (70.17)	70 (64.22)
% marks obtained	72.13	70.24	72.29
Number of learners continuing programme	38 (56.72)	28 (68.29)	66 (60.55)
Number of learners not continuing programme	2 (2.99)	2 (4.88)	4 (3.67)

Note: n=Number of learners reported, figures in parentheses are percentage to n.

Learner Support Services at Study Centers: Types and Extent of Use

In IGNOU, the learner support services were provided through a three-tier structure and the regional and study centers played a major role. The university set up the regional centers in major cities of the country to provide administrative support for admission in the programmes, organization and coordination of academic counselling of the learners, and conduct of the examination. They served as an important link between the University and the study centers. Facilities for the provision of support services such as academic and practical counselling called study centers were established at the conventional universities or institutions. The important support services provided at the Study Centers is given in Table 5.

The study revealed that about 58% of the learners used the learner support services provided at the study centers. However, some learners made use of the University Website to access basic information and support. About 23% of learners used support services both at study centers and online (University Website). About 8% of the learners revealed that they used only University Website for support services, which means they did not attend counseling sessions at study centers (Table 3).

Table 3: Nature of support services used by the learners of PGDFSQM programmes

Particulars (Number of learners who had)	Male (n=65)	Female (n=41)	Overall (n=106)
Used the learner support services at Study Center	39 (60.00)	23 (56.10)	62 (58.49)
Not used the learner support services at Study Center	26 (40)	18 (43.90)	44 (41.51)
Used learner support services at both Online and study center	17 (26.15)	7 (17.07)	24 (22.64)
Used online learner support services only	6 (9.23)	3 (7.32)	9 (8.49)

Note: n=Number of learners reported, figures in parentheses are percentage to n.

Table 4: Role of learner support services in successful completion of the programme

Particulars (Number of learners used the support services at ....)	Learners who completed the programme (n=37)	Learners who have not completed the programme (n=67)
Study centers	24 (64.86)	36 (53.73)
Study centers and online platform	12 (32.43)	10 (14.93)
Web-based support services only	3 (8.11)	6 (8.96)

n=Number of learners reported

The information on the role of learner support services on learner performance is presented in Table 4. It can be concluded that the learners who used the support services were more successful in completing their programme. Among the successful learners, 72.97% of the learners (64.86% of the learners at study centers and 8.11% of the learners at Web-based platform) used the learners support services. Whereas in case of learners who did not complete the programme, learner support services were used by only 62.69% of the learners (53.73% of the learners at study centers and 8.96% of the learners at Web-based platform). This confirmed that learners support services played an important role in successful completion of the studies of the learners. The data presented in Table 4 further indicated that learners who used the Web-based learners support services along with support services at study centers were more successful in their studies. About 32.43% successful learners used a combination of the support services at study centers and University Website.

Components Available at the Study Centers and Trend of their Uses by Learners

The data in Table 5 presented the types of support services used by the learners and their usefulness and effectiveness. Submission of assignments and availability of the study material was the most used learner support service (82% of the learners) followed by interaction with study peers (66.67% of the learners), feedback on assignments (54.35% of the learners), pre-admission support (52.94% of the learners), and audio-video programmes (50% of the learners). Face-to-face counselling at study centers was attended by 45% of the learners which was the core of the support services at study centers. Teleconferencing and interactive radio counseling were used by 36.17% and 21.28% of the learners, respectively. About 86% of the learners expressed that they regularly used the assignment submission service at study centers. This service was extremely useful (44.44% of the learners) and delivered very 'good' to 'extremely good' (67% of the learners). About 68% of the learners regularly used the services of availability of study material in study centers. It was "extremely useful" to 44.74% of the learners and "very useful" to 50% of the learners. This service was delivered 'extremely good' to 31% of the learners and was 'very good' to 38% of the learners.

For overall learner support services at study center, 75% of the learners expressed that they used support services at the study centers. About 50% of the learners used support services regularly and 46% of the learners used services occasionally. In overall, services at study centers were 'extremely useful' to 33% of the learners and 'very useful' to 54% of the learners. Regarding effectiveness of support services delivered at the study center, 29% of the learners expressed that delivery of services was 'extremely good' whereas 33% of the learners expressed 'very good' delivery of support services.

Face-to-face counselling was one of the most important support service components provided at the study center. The main purpose of face-to-face counselling session was to clarify and explain the subject contents to the learners. This facilitated and motivated the learner to complete the programme of study. About 71.67% of the learners attended the face-to-face counselling sessions. About 33% of the learners informed that they attended all face-to-face counseling sessions. About 18.52% of the learners attended up to 5 sessions and 11-20 sessions (Table 6). In these sessions, subject related contents were covered substantially (57.50% of the learners) and adequately (42.50% of the learners). The learners reported that general information related to courses was covered substantially (44.44% of the learners) and adequately (52.78% of the learners). About 50% and 38.24% of the learners reported that administrative and motivational aspects were adequately covered, respectively (Table 7).

Table 5: Components of support services used by the learners at the study centers

Components of Web support	Used		Extent of use				Extent of usefulness					Effectiveness of delivery					
	n	Yes (%)	n	Regu-larly	Occasio nally	Seldo m	n	Extreme ly useful	Very useful	Somewh at useful	Not use-ful	n	Extre mely good	Very good	Good	Satisfact ory	Not good
Pre admission support	51	52.94	28	42.86	42.86	14.29	29	17.24	55.17	20.69	6.90	28	14.29	32.14	25.00	21.43	7.14
Admission counselling	49	36.73	21	47.62	23.81	28.57	25	4.00	56.00	24.00	16.00	25	12.00	36.00	16.00	24.00	12.00
Availability of study material	50	82.00	38	68.42	26.32	5.26	38	44.74	50.00	5.26	0.00	37	29.73	37.84	18.92	13.51	0.00
Face-to-face counseling	46	45.65	26	46.15	34.62	19.23	27	33.33	25.93	37.04	3.70	26	26.92	23.08	15.38	26.92	7.69
Teleconferencing	47	36.17	25	8.00	60.00	32.00	24	8.33	41.67	41.67	8.33	24	4.17	25.00	33.33	20.83	16.67
Interactive radio counselling	47	21.28	18	5.56	55.56	38.89	18	11.11	33.33	38.89	16.67	18	5.56	22.22	22.22	22.22	27.78
Assignment submission	51	82.35	36	86.11	13.89	0.00	36	44.44	44.44	11.11	0.00	36	33.33	33.33	19.44	13.89	0.00
Feedback on assignments	47	55.32	28	50.00	32.14	17.86	28	17.86	53.57	21.43	7.14	28	14.29	32.14	32.14	14.29	7.14
Interaction with study peers	45	66.67	29	58.62	37.93	3.45	30	30.00	43.33	23.33	3.33	30	26.67	36.67	16.67	16.67	3.33
Audio-video programme	44	50.00	22	27.27	54.55	18.18	22	13.64	59.09	22.73	4.55	23	26.09	30.43	17.39	21.74	4.35
Supplemental study material	46	54.35	24	58.33	25.00	16.67	24	20.83	45.83	29.17	4.17	24	12.50	25.00	37.50	25.00	0.00
Post program support	47	38.30	18	33.33	50.00	16.67	18	22.22	50.00	11.11	16.67	17	29.41	23.53	17.65	11.76	17.65
Overall	35	74.29	24	50.00	45.83	4.17	24	33.33	54.17	8.33	4.17	24	29.17	33.33	25.00	12.50	0.00

Note: n=Total numbers of learners responded to the particular information

Awareness About the Web-based LSS and Learners' Perception on the Utility of the Web-based LSS

In the PGDFSQM programme, Web-based learner support platform called 'e-Gyankosh' was available from 2009 to 2013 in addition to the learner support at the study centers. A learner was required to register on Web-based platform freely and voluntarily. The major services provided through this platform included online admission facilities, induction meeting and theory counseling through Web conferencing, submission of assignments, discussion forum, etc. This study included only those learners who did not register on the online platform.

Table 6: Information about face-to-face counseling at study center

Particulars	Number of learners	Percentage
Number of students attended the face-to-face counseling at sessions at study centers (n=60)	43	71.67%
Number of sessions attended by the learners(n=27)		
Up to 5	5	18.52
6-10 sessions	4	14.81
11-20 sessions	5	18.52
21-30 sessions	3	11.11
All sessions	9	33.33
No remembering	1	3.70

Note: n=Total numbers of learners responded to the particular information

Table 7: Types of contents were covered in face-to-face counseling sessions of PGDFSQM (in percentage)

Type of content	Substantially covered	Adequately covered	Less covered	Not covered
Subject related (n=40)	57.50	42.50	0.00	0.00
General information about courses (n=36)	44.44	52.78	2.78	0.00
Administrative aspects (n=32)	28.13	50.00	15.63	6.25
Motivational aspects (n=34)	38.24	38.24	20.59	2.94

Note: n=Total numbers of learners responded to the particular information

The data with respect to awareness about the Web-based LSS is presented in Table 8. About 57% of the learners of PGDFSQM were aware that a Web-based learner support services was available under this programme. Out of aware learners, 56.67% of the learners revealed that they used the Web-based learner support services. Data were also gathered on learners' perception about the utility of the Web-based support services. About 89.80% of the learners expressed that Web-based learner support services was helpful in timely and successful completion of the programme. The online learning material was helpful in programme of study was expressed by the 94% of the learners (Table 9).

Table 8: Awareness about Web-based learners support services

Particulars	Awareness about Web-based learners support services (n=107)		Use of Web-based learners support services (n=60)	
	Number	%	Number	%
Yes	61	57.01	34	56.67
No	46	42.99	26	43.33

Note: n=Total numbers of learners responded to the particular information

Table 9: Learners' perception of the utility of the Web-based LSS

Particulars	No. of learners	Percent
Web-based support system is helpful (n=98)	88	89.80
Making available the study material on online platform shall help in completing the programme (n=103)	97	94.17

Various attributes of the online study material which contributed to the completion of the program were included in the study are presented in Table 10. About 55% of the learners strongly agreed that 24/7 availability of online study material was helpful in successful completion of the programme. More than 90% of the learners agreed to strongly agreed that flexibility in online study material and suitability of online content to new generation learners are helpful to complete their studies. About 50% of the learners agreed that online study material provides easy navigation in content that help them to complete the study. About 86% of the learners agreed to strongly agreed that easy updating of online content helped them complete the programme (Table 10).

Table 10: Role of online study material in completion of the programme (in percentage)

Particulars	N	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Study material is available 24 x7	91	56.04	37.36	4.40	2.20	0.00
Helps in understanding of contents	88	35.23	45.45	17.05	2.27	0.00
Facilitates updating of content	87	43.68	42.53	9.20	4.60	0.00
Flexibility	88	40.91	51.14	4.55	3.41	0.00
Suited to "New Generation Learners"	88	51.14	42.05	5.68	1.14	0.00
Provides multimedia	86	45.35	37.21	13.95	3.49	0.00
Easy navigation	82	36.59	50.00	10.98	2.44	0.00
Helps in interaction with students and teachers	82	31.71	48.78	15.85	2.44	1.22
Other	18	50.00	27.78	11.11	0.00	11.11

Note: n=Total numbers of learners responded to the particular information

Information about the Digital Devices

Most of the learners expressed that Web-based support system can facilitate successful completion of distance education programme. It was important to study the readiness of the learners about the Web-based support system. Koroghlanian and Brinkerhoff (2008) also suggested considering the knowledge and skills about computers possessed by the learners in designing of Web-based support system. Types of digital devices, availability of internet connection and its speed, comfortability and digital device preferences of the learners were important considerations in designing Web-based support system. The information on availability, usability, and preferences of digital devices are presented in Table 11.

Table 11: Availability, usability and preferences of digital devices (in%)

Particular		Desktop computer	Laptop	iPad/ tablet	Simple mobile phone	Smart mobile phone
Owing of Digital device	n	70	80	36	39	74
	Owned device (%)	65.71	83.75	22.22	48.72	89.19
Internet on digital device	n	56	70	19	21	61
	Having internet	71.43	75.71	42.11	19.05	100.00
Speed of internet connection		41	50	8	4	57
	Very good	19.51	26.00	25.00	0.00	19.30
	Good	70.73	64.00	50.00	50.00	61.40
	Slow	9.76	10.00	25.00	25.00	15.79
	Very slow	0.00	0.00	0.00	25.00	3.51
Comfortable in using the device	n	45	56	8	7	55
	Very comfortable	42.22	48.21	50.00	57.14	41.82
	Comfortable	53.33	46.43	25.00	14.29	45.45
	Not much comfortable	4.44	5.36	25.00	28.57	12.73
	Not comfortable	0.00	0.00	0.00	0.00	0.00
Frequency of using digital device	n	46	58	9	8	56
	Frequently	71.74	75.86	55.56	62.50	85.71
	Occasionally	21.74	18.97	22.22	12.50	12.50
	Rarely	6.52	5.17	22.22	25.00	0.00
	Never	0.00	0.00	0.00	0.00	1.79
Preferences on types of digital device	n	65	78	41	34	72
	Very strongly prefer	52.31	71.79	39.02	29.41	55.56
	Strongly prefer	15.38	16.67	17.07	8.82	23.61
	Prefer	16.92	8.97	24.39	14.71	12.50
	Slightly prefer	7.69	0.00	4.88	5.88	2.78
	Not preference	7.69	2.56	14.63	41.18	5.56

n=Number of learners reported

Most of the learners (89.19%) had smart mobile phones followed by laptop (83.75% of the learners) and desktop computer (65.71% of the learners). About 49% of the learners had simple mobile phones and 22% of the learners had iPad/Tablet. All learners who had smart mobile phones had access to the internet. About 75.71% of the learners who had a laptop and 71.43% of the learners who had desktop computers had access to the internet. Good speed of the internet was reported on desktop computers (71% of the learners), followed by laptop (64% of the learners), and smart mobile phone (61.40% of the learners). Very good speed of internet was reported on laptop (26% of the learners), iPad (25% of the learners), desktop computer and smart mobile phone (19% of the learners each). More than 90% of the learners expressed that they were 'very comfortable' to 'comfortable' in using the desktop and laptop devices.

About 86% of the learners expressed comfortability in using smart mobile phone. About 86% of the learners having smart phone were using smart phone frequently, followed by laptop (76% of the learners) and desktop computer (72% of the learners). The laptop was very strongly preferred by the 72% of the learners, followed by smart mobile phone (56% of the learners), desktop computers (52% of the learners). This showed that Web-based LSS should be designed keeping in view the features of laptops and smart mobile phones as most learners preferred them. Most learners had these digital devices and they frequently used them.

Opinions of the Learners about Requisite Components of Web-based LSS

From the preceding discussion, it can be concluded that Web-based LSS may be provided to the learners to facilitate successful completion of the programme of study. The responses of 43 learners on the facilities that should be made available in the Web-based LSS have been summarized in Figure 1.

Box 1: Requisite components for web based learner support system

Online tool for project proposal and report submission, evaluation and confirmation
Contact class of theory through live web conferencing
Recorded video lecture/class for availability by 24x7.
Online videos along with animation for laboratory works.
Online access to study material by 24x7 and availability of updated study material.
Learner self assessment.
Updated information about the programme.
Online assignment submission, SMS and email alert regarding assignments, contact class, project work and exams.
Information about required configuration of machine for web support system.
Online chats among the learners, mentor, guide and teacher.
24x 7 help lines to clear the queries.
Regular and direct communication among university professors, study centre faculty, learners and staff at the regional centres.
Online examination and online updating of marks and result declaration
Final Certificate and Mark sheet should also be available online for downloading purpose apart from sending hard copy.
Smart Phones Compatible apps for fast information dissemination
Case studies, solved and unsolved exam papers
Orientation of study centres and learners, for proper and skilful use of web based learners support.
Information about successfully completed learners and their industry experience.
Forthcoming employment opportunities based on this programme

Figure 1. Requisite components for Web-based support system

Willingness to Pay (WTP) for Web-based LSS

Learner support services were mainly provided through the regional centers and study centers. Some of the services provided by them can be effectively performed by the Web-based learner support services. About 90% of the learners revealed that support services using Web technology will be helpful in timely and successful completion of the programme of study. A question was asked to the learners, are you willing to pay additional fee for such Web-based LSS, and if answer is 'yes', how much additional amount you are willing to pay. About 49% of the learners agreed to pay the additional fee for Web-based LSS. The learners expressed WTP on an average additional of an amount of about 29.32% for Web-based support system. Most of the learners (32.5%) expressed WTP up to 10%. Additional fee between 11-20% was expressed by 30% of the learners (Table 12) (Jain, Mythili & Salooja, 2018).

Table 12: Willing to pay (WTP) for a Web-based LSS

Particular	No. of learners	Percent
Agreed to pay additional fees (n=84)	41	48.81
Not agreed to pay additional fees (n=84)	43	51.19
WTP (n=40)		
Up to 10%	13	32.5
11-20%	12	30
21-30%	3	7.5
31-40%	3	7.5
More than 40%	9	22.5
Average WTP	29.32%	

Note: n=Total numbers of learners responded to the particular information

Conclusions

Learner support services were important for the learners who were pursuing academic programmes under the ODL system. The learners who were guided by the support services were more successful in completing the programme of study. With the growth of technology in the education field, most of the ODL institutions incorporated Web-based support services to their operations. The learners who utilized Web-based support services were more successful in completing their studies. The ODL institutions need to develop an integrated model of learner support services using both conventional study center approach and Web-based technologies. Web-based technologies may be used for pre-admission support, assignment submission, online study material, and virtual counseling which were the most required support services for the learners. The majority of the learners agreed that Web-based support services were helpful in completing the programme as most of the learners have mobile phone and laptop which helped them access online study materials. Also most of the learners prefer these digital devices for the Web-based support services. Therefore, ODL institutions should consider these devices in designing Web-based learners support services. The Web-based LSS should include the services like online project management tool, virtual classes, online study materials including e-content, digital repository of audio-video programme such as podcasting to supplement the study materials, online examination, 24/7 learners query management system, SMS and email alerts, smart phone compatible apps, online interaction among learners and teachers, and online updating and declaration of result. As the learners expressed WTP for Web-based support system, the ODL institutions should implement Web-based learner support services in each of the academic programmes.

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Evaluating the Use and Acceptance of eLearning for Tertiary Education among Senior High School Students

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Abstract

This paper sought to determine senior high school students' preconceived notions about eLearning, as well as their behavioral intention to pursue tertiary education online. Generally, it aimed to evaluate the use and acceptance of eLearning technologies among senior high school students in a private high school in Los Baños, Laguna. Stratified sampling was used to identify respondents from five K-12 strands – accountancy, business and management (ABM); science, technology, engineering and mathematics (STEM); humanities and social science (HUMSS); information and communication technology (ICT); and general academic strand (GAS). Grounded in the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), 200 respondents were surveyed. The moderating effect of UTAUT variables on the respondents' behavioral intention was examined through correlation and regression analysis. Results showed that majority of the respondents had a positive behavioral intention to pursue tertiary education through eLearning. Of the UTAUT constructs, only performance expectancy was found to be a significant predictor of behavioral intention. A weak association was observed between sex and social influence; as well as between age and hedonic motivation.

Keywords: *eLearning technologies, UTAUT, UTAUT2, use and acceptance, eLearning for tertiary education*

Introduction

The Philippines aims to raise the quality of education and ensure that all its citizens have equal access. According to the Philippine Development Plan (PDP) 2017-2022 published by the National Economic Development Authority (2017), most of the challenges faced by educational reform initiatives is caused by the lack of 'human capital development'. There is a huge need to improve educational facilities and services to increase the participation rate of students. In order to achieve global competency standards and address the problems faced by our educational system, the government has put in more effort by increasing the budget and initiating beneficial structural changes in the primary and tertiary levels (Macha, Mackie, and Magaziner, 2018).

As a country that values education and sees it as a "great equalizer of opportunities," collaborative effort to improve the learning and instruction process through information and communications technology (ICT) has been encouraged (Garcia, 2017). Several initiatives meant to improve the quality of education have been implemented. On the side of learners, alternative learning system (ALS) programs have been designed for out-of-school youths (OSY) to enhance their technical and vocational skills. For teachers, many programs have been developed to hone their instruction skills. These include pre-service teacher training programs through practicum teaching and establishment of teacher education institutions (TEIs).

One of the most notable actions taken by the government is the full implementation of the K to 12 Education Program. The program was introduced in 2010 and was signed as a Republic Act in 2013. Prior to this reform, the Philippines was only one of three countries who had yet to employ the K to 12 system of education (Official Gazette, n.d.). The Commission on Higher Education (CHED) is committed to ensuring quality education for all Filipinos; guided by the belief that education is a right, not a privilege. With the full implementation of Republic Act 10931 (R.A. 10931) or the Universal Access to Quality Education Act, all Filipino citizens will have equal opportunity to learn in state universities and colleges (SUCs) and local universities and colleges (LUCs). R.A. 10931 democratizes education by allowing free tertiary education.

The year 2018 saw the first batch of graduates from the K to 12 Program. With it, came a surplus of potential college students. The higher number of people gearing for tertiary level education poses a problem for traditional residential universities, due to the lack of physical, financial, and human resources to sufficiently accommodate the influx of new learners.

The inadequacy of current infrastructure is one of the issues that must be addressed - one that can be answered with eLearning technologies. eLearning maximizes the potential of existing technologies, such as the internet, to address teaching and learning gaps and equip both students and teachers with new knowledge and skills (Oye, Salleh, & Iahad, 2010). Its primary purpose is to "increase accessibility of education and reduce transportation and infrastructure costs" (Chen & Jang, 2010). Furthermore, eLearning also facilitates intercultural exchange of knowledge and promotes lifelong learning for all (Nagarajan & Wiselin, 2010). Open and Distance eLearning (ODeL) clearly presents a solution to the residential limits of traditional universities.

With the emergence of eLearning technologies in the 21st century, researchers have sought to determine factors that affect technology adoption. Following the belief that that acceptance is a precursor to technology adoption, many studies have focused on the factors that could affect intention to use. Given ODeL's capability to make quality education accessible to all, this study was done to determine future college student's – particularly senior high school (SHS) students – perception, use, and acceptance for eLearning in tertiary education.

Objectives

In general, this study aimed to determine the acceptability of ODeL for tertiary education among senior high school students.

Specifically, it aimed to:

1. Determine the socio-demographic characteristics of the respondents;
2. Describe the respondents' perception of eLearning technologies;
3. Identify senior high school students' behavioral intention to pursue undergraduate studies completely through eLearning;
4. Determine the relationship between the UTAUT constructs and the respondents' socio-demographic profile; and
5. Identify the factors, grounded in UTAUT, affecting senior high school students' behavioral intention.

Conceptual/Theoretical Framework

This study was guided by the Unified Theory of Acceptance and Use of Technology (UTAUT), which is a synthesis of eight user acceptance models – Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Motivational Model (MM), TAM and TPB combination, innovation diffusion theory (IDT), Social Cognitive Theory (SCT), and PC utilization model (Venkatesh, Morris, Davis & Davis, 2003). This model aims to describe users' acceptance and intention to use a technology.

UTAUT posits that there are four direct determinants of behavioral intention (BI) and use. These are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). Additionally, the relationship between the constructs and BI and use is moderated by four factors – age, sex, voluntariness of use, and experience (Venkatesh, et. al., 2003).
Since the initial UTAUT viewed technology adoption more from an organizational context, the research model was extended to account for consumer acceptance and use of technology. UTAUT2 had three additional constructs – hedonic motivation (HM), price value (PV), and habit (H), which were included based on a review of prior technology adoption research. In terms of the moderating factors, voluntariness of use was removed (Venkatesh, Thong & Xu, 2012).

In this paper, only the direct determinants of behavioral intention were examined. Other factors such as self-efficacy and computer anxiety were excluded. PE was operationalized as the degree to which respondents' believed the use of eLearning technologies would be helpful in achieving their academic goals. EE referred to the respondents' belief about the amount of effort they need to exert into using eLearning technologies. SI measured the value of the respondents' significant others' perception about eLearning. FC encapsulated the factors that enabled them to pursue tertiary education online. This included the physical resources, as well as know-how to operate eLearning technologies. HM referred to the degree of enjoyment the respondents will get from an eLearning environment. PV measured the monetary cost respondents would incur from eLearning. Lastly, H referred to the automaticity respondents' associated with their use of eLearning technologies. It measured the degree to which eLearning technologies was integrated into their lives.

This study's theoretical framework (Fig. 1.) illustrates the relationships between variables. Seven UTAUT constructs were used. As for the moderating factors, voluntariness of use was removed because, in an eLearning institution, the use of eLearning technologies would automatically become mandatory.

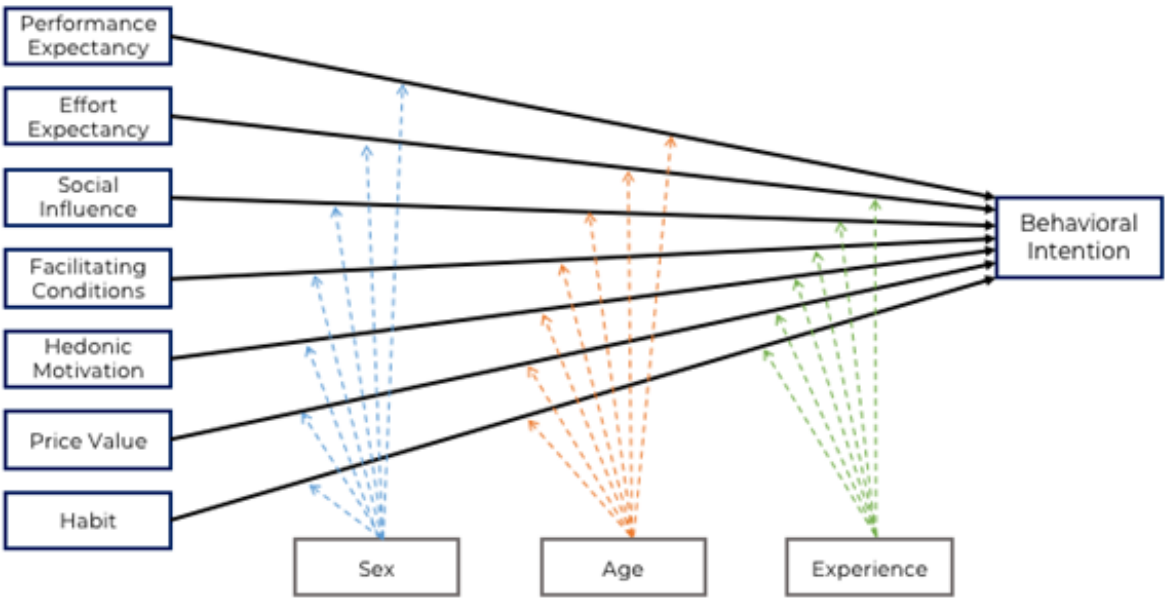

Figure 1. Theoretical Framework of the Study

The conceptual framework (Fig. 2) illustrates the theorized relationships that will be examined in this paper. To be specific, the constructs' influence on behavioral intention, and the sociodemographic profile's moderating effect on the constructs will be examined.

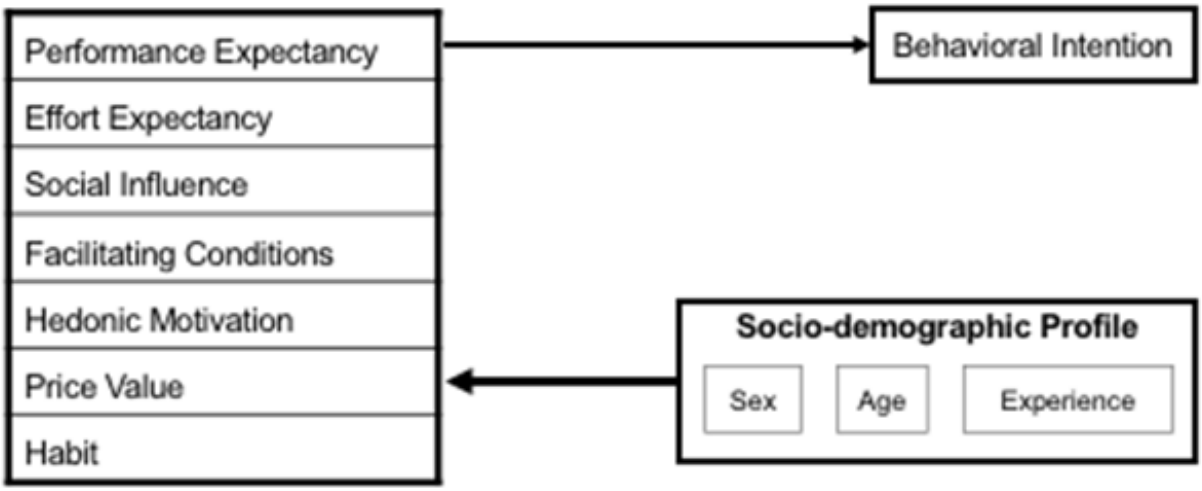

Figure 2. Conceptual Framework of the Study

Review of Related Studies

ICT has played a significant role in widening access to quality education around the world. This is especially true in developing countries, with the incorporation of technology in new teaching methods, and implementation of eLearning in general. eLearning has brought forward a more convenient way for learners and instructors to exchange information and gain knowledge (Tarhini, Hone & Liu, 2013).

In many developing countries, eLearning is promoted as a solution for democratizing education. The Philippines, for example, has mandated the expansion of access to quality education through open and distance learning in higher education since 2014. Moreover, the Commission on Higher Education (CHED), in its CHED Memorandum Order no. 46, mandated all Higher Education Institutions (HEI) to develop outcome based curricula. This was made to promote learner-centered education. This is a promising initiative but still questions the country's readiness in adopting such change (Doculan, 2016). An important method to determine the country's preparedness for educational reforms is to identify the attitude and behavioral intentions of the potential learners.

One of theories used to examine technology acceptance and use is the UTAUT, which integrates eight leading user acceptance models (Venkatesh, et.al, 2003). In this theory, four direct determinants of behavioral intention is proposed - PE, EE, SI, and FC. It was noted that the most significant predictor of behavioral intention is the PE. The underlying constructs of this predictor includes perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations. This was later modified by Venkatesh and colleagues (2012) to include more constructs – HM, PV, and H. UTAUT2 viewed technology adoption from a consumer's point of view. Dečman (2015) tested UTAUT's validity in a mandatory eLearning environment of a higher education institution and determined that the theory was generally applicable in eLearning settings. Wang, Wu, & Wang (2009) used UTAUT to evaluate mobile learning (mLearning) acceptance in Taiwan. Using structural equation modeling, results showed that constructs such as performance expectancy, effort expectancy, social influence, perceived playfulness, and learning self- management were significant determinants of behavioral intention. In addition, gender and age differences had a moderating effect on the constructs.

Ngampornchai & Adams (2016) examined the acceptance and readiness for eLearning of students from Northern Thailand. UTAUT constructs were examined in conjunction with the respondents' ability to self-regulate, ownership of computer devices, and familiarity with educational technologies. Results showed that PE and EE were strong indicators of technology acceptance. It was noted that the students who think that eLearning is useful and easy are more likely to be motivated in using it. The approval of parents was also seen as associated with the attitude and perception of the students with regards to eLearning.

In a study conducted by Khechine, Bytha, and Lakhal (2014), they examined the moderating effects of age and sex in the behavioral intention of students to utilize eLearning, particularly webinars, for education. It employed the UTAUT model as the framework. Age had a moderating effect on BI. On the other hand, sex did not have a significant effect with the students' intention to participate in webinars. It was noted that respondents' behavioral intention towards eLearning depended on their performance expectancy as they believed that the chances that they will be employed or accepted for further studies depended on the results of their academic performance. Mandelbaum (2014) examined the perceptions of employers of eLearning and the employability of online degree graduates in their institutions. He employed both quantitative and qualitative data

for the study where the researcher used a survey questionnaire and interviewed the participants. The results showed that majority of the employers and administrators see online learning as valuable. Some of the respondents noted that the reputability of the online graduates' institution was an important factor to be considered.

In a study conducted by Alasmari (2017), he explored the acceptance of the graduate students in Saudi Arabia of the mobile learning technology. The results showed that there was an association between four factors in the UTAUT model except for the social influence construct which was affected by the gender variable. Men showed stronger intentions in engaging in mobile learning than women.

Danesh Sedigh (2013) analyzed the use of a theoretical model in the Evidence Based Medicine (EBM) trainers' acceptance of eLearning. The researcher found out that the most influential factor to the behavioral intention (BI) in utilizing an eLearning framework is experience. The data was gathered through the use of Technology Acceptance Model (TAM) for the survey.

Wijewardene, Azam and Khatibi (2018) explored the perception of students in online learning and its perceived risk. It aimed to determine the UTAUT factors influencing the behavioural intention of the students in Sri Lanka. Results showed that Performance Expectancy (PE), among all the UTAUT factors, was the most influential in the students' intention in using online learning.

In Thomas, Singh, and Gaffar's (2013) study, the researchers determined the acceptability of mobile learning for higher education in a developing country like the Philippines. The proponents used UTAUT model in explaining the results. They emphasized that the facilitating conditions should be addressed and their attitude towards eLearning should be improved. Performance expectancy and social factors were found to influence behavioral intention.

Carbonilla Gorra and Bhati (2016) studied the perceptions of the students in Surigao, Philippines in using eLearning methods in the classroom. They noted the positive and negative effects of eLearning as perceived by the students in the province. It was discovered that students are more encouraged to use the technologies if they are not accessed through mobile phones.

With the implementation of the K-12 program in the country and the potential of eLearning to cater to the surplus of SHS graduates, it has become increasingly important to study the factors that would make them consider eLearning as a viable mode of study for their tertiary education. Many researchers have sought to determine certain populations' readiness for eLearning; however, there is a lack of research that explored the acceptability of eLearning among SHS in the Philippines. As articulated by Wang and colleagues (2003), acceptance is critical in the successful implementation of eLearning systems.

Methodology

This study sought to determine factors that could predict SHS students' behavioral intention to pursue tertiary education through eLearning. A quantitative research design was used.

Respondents were identified from the five tracks of the K-12 program – ABM, STEM, HUMSS, ICT, and GAS – using stratified sampling. A survey questionnaire was designed to collect data from the respondents, whose consents were obtained beforehand, in accordance with R.A. 10173 or the Data Privacy Act.

The survey questionnaire was divided into three parts. The first part was designed to collect information on the respondents' sociodemographic profile. The second part consisted of multiple choice, yes or no questions, and open- ended questions aimed at gathering data on SHS students' perception about and prior experience with eLearning. The third and last part consisted of Likert-type statements designed to measure the UTAUT constructs. A 5-point Likert scale ranging from strongly agree to strongly disagree was used. Table 1 shows the corresponding numerical value for each of the Likert scale's response categories.

Table 1. Five-point Likert Scale Interpretation

Response Categories	**Numerical Value**
Strongly Agree	1
Agree	2
Neither Agree or Disagree	3
Disagree	4
Strongly Disagree	5

For data analysis, descriptive statistics was used in conjunction with inferential statistics. Aside from frequency counts and measures of central tendency, correlation and regression analyses were employed to determine the relationship between independent and dependent variables. Specifically, Chi-square test of independence and Spearman correlation was used to determine the relationship between the sociodemographic profile and UTAUT constructs; logistic regression was used to examine the relationship between the UTAUT constructs and behavioral intention.

Results and Discussions

Senior high school students were surveyed to determine their acceptance of eLearning by identifying predictors of their behavioral intention to take tertiary education online. The study took into account the different strands characteristic of the K-12 program. A total of 200 out of 227 respondents gave their consent to participate, giving this study a response rate of 88.11%.

Sociodemographic Profile

Results showed that respondents were aged 17-21 years old, with the majority (68.7%) being 17. There were slightly more females (53.5%) than males (46.5%). Majority of them (79.7%) had plans to take up undergraduate studies in the fields of medicine, engineering, sociology, communication, computer science, agriculture, and psychology, to name a few.

In terms of their technology use, there was an equal amount of respondents (50%) who owned a personal computer or laptop and those who did not. A total of 83.4% of the participants had internet access. With regard to the devices used for internet access, smartphones were the most prominent (88.06%), followed by laptops/computers (46.77%), and then tablets (12.94%).

The respondents primarily used technology for communication (46%), followed by knowledge acquisition (22%), skills development (18.5%), entertainment (15%), and information sharing (11%). All of the respondents were familiar with using technology to support their learning activities. With their smartphones, laptops/computers, or tablets, they accessed socializing spaces (85%), chat applications (51.5%), audio/video materials (37%), educational games (33.5%), virtual libraries (18.5%), learning platforms (15%), online courses (14.5%), and online forums (10.5%).

Perception of eLearning Technologies

The respondents were asked questions about their perceptions on eLearning. While majority had preconceived notions about eLearning, 15.5% had no idea; 46% described eLearning as online learning, 44.5% believed it was learning at their own pace, 31.5% thought it was attending live lectures over the internet, and 26.5% had the impression that it was learning by watching pre-recorded videos.

While majority (65.5%) believed that eLearning enabled learners to have a flexible schedule, only 48% believed it provided people with a solution for studying despite their geographical location. Even less (38.5%) had knowledge about technologies that enabled students to take exams or submit assignments online. While 36% thought interaction between students and instructors was feasible using different tools, only 18% believed collaboration between students was possible. In terms of cost, 97% believed eLearning is more affordable than the traditional residential mode of study. Only a little less than one-third (23.1%) of the respondents doubted the feasibility of online lectures.

UTAUT constructs were measured through Likert-type statements. In general, the respondents mostly agreed with the statements under PE, EE, SI, FC, HM, and H. However, the overall degree of agreement for PV leaned more on the neutral side. A summary is presented in Table 2.

Table 2. Respondents' Likert scale responses to the UTAUT constructs

Construct	SA		A		NAD		D		SD		Total	Interpretation
	N	%	N	%	N	%	N	%	N	%		
PE1	66	33	106	53.00	26	13.00	2	1.00	0	0	200	Agree
PE2	35	17.59	109	54.77	50	25.13	5	2.51	0	0	199	Agree
PE3	69	34.67	94	47.24	30	15.08	6	3.02	0	0	199	Agree
PE4	40	20.41	82	41.84	59	30.10	13	6.63	2	1.02	196	Agree
EE1	36	18	99	49.50	54	27.00	9	4.50	2	1	200	Agree
EE2	31	15.5	92	46.00	71	35.50	6	3.00	0	0	200	Agree
EE3	32	16	96	48.00	62	31.00	9	4.50	1	0.50	200	Agree
EE4	27	13.85	85	43.59	70	35.90	10	5.13	3	1.54	195	Agree
SI1	28	14	84	42.00	65	32.50	19	9.50	4	2	200	Agree
SI2	24	12.31	84	43.08	65	33.33	19	9.74	3	1.54	195	Agree
SI3	31	15.90	81	41.54	65	33.33	16	8.21	2	1.03	195	Agree
FC1	38	19	97	48.50	52	26.00	12	6.00	1	0.50	200	Agree
FC2	30	15.08	116	58.29	46	23.12	7	3.52	0	0	199	Agree
FC3	35	17.5	92	46.00	64	32.00	9	4.50	0	0	200	Agree
FC4	39	19.5	102	51.00	52	26.00	6	3.00	1	0.50	200	Agree
HM1	38	20	116	61.05	29	15.26	7	3.68	0	0	190	Agree
HM2	45	22.61	109	54.77	41	20.60	2	1.01	2	1.01	199	Agree
HM3	47	23.86	103	52.28	41	20.81	5	2.54	1	0.51	197	Agree
PV1	38	19	74	37.00	81	40.50	7	3.50	0	0	200	Neutral
PV2	19	9.5	70	35.00	96	48.00	13	6.50	2	1	200	Neutral

PV1	38	19	74	37.00	81	40.50	7	3.50	0	0	200	Neutral
PV2	19	9.5	70	35.00	96	48.00	13	6.50	2	1	200	Neutral
PV3	28	14	87	43.50	79	39.50	6	3.00	0	0	200	Agree
H1	33	16.92	78	40.00	69	35.38	15	7.69	0	0	195	Agree
H2	26	13.47	85	44.04	70	36.27	10	5.18	2	1.04	193	Agree
H3	31	15.82	72	36.73	72	36.73	20	10.20	1	0.51	196	Agree

Behavioral Intention

Majority of the respondents (71.2%) was willing to take their undergraduate degrees through an online learning institution. They cited accessibility of resources (61%) as the most important factor in an online learning environment, followed by student support (42.5%), collaborative environment (41.5%), engaging interactive content (39%), and teacher presence (36%) as the least. With regard to the perception of possible employers, 87.8% of the respondents did not believe eLearning graduates will be discriminated against. This is reinforced by Mandelbaum's (2014) study that found employers' perception of online graduates' employability to be positive. However, this perception is influenced by the reputability of their institution.

Moderating effect of Sociodemographic Characteristics

The association between the sociodemographic characteristics and UTAUT constructs was analyzed through Chi-square test of independence and Spearman Correlation.

The following hypothesis was tested for the chi-square test of independence:
Ho: The variables are independent. Ha: The variables are associated
Decision Rule: Reject Ho if p-value < $\alpha = 0.05$.

The values obtained for the chi-square test of independence are summarized in Table 3.

Table 3. Relationship between respondents' age and UTAUT construct scores

Construct	Test Statistic	p-value	Conclusion
PE	42.6639	0.956	Not associated
EE	50.5875	0.961	Not associated
SI	44.1624	0.706	Not associated
FC	49.5069	0.831	Not associated
HM	88.7446	0.027	Associated
PV	25.5208	0.991	Not associated
H	52.4288	0.746	Not associated

Results showed that of all the constructs, only HM was associated with age. To quantify this association, Spearman correlation was used. Values obtained from this statistical test were interpreted according to Table 4.

Table 4. Interpretation for Spearman correlation values

Value	Interpretation
0.01 to 0.19	Very Weak
0.2 to 0.39	Weak
0.4 to 0.59	Moderate
0.6 to 0.79	Strong
0.8 to 0.99	Very Strong

With the resulting coefficient (-0.0866), the Spearman correlation analysis showed a very weak inverse association between age and HM. As age increased, HM score decreased. However, it should be noted that the inverse association was a result of the lower numerical value assigned to the Likert scale response "strongly agree." Therefore, as the age of participants increased, their agreement with the sentiment that "eLearning technologies are enjoyable" increased as well.
As for sex, results of Spearman correlation found that it has a very weak direct association (0.1488) with SI. In general, there were more males who agreed with the idea that people around them approved of eLearning technologies, which supported prior research.

These results were consistent with previous eLearning acceptance studies using UTAUT. Wang and colleagues (2009) examined mLearning acceptance in Taiwan and determined that age and sex had a moderating effect on some of the UTAUT constructs. To be specific, Wang and colleagues (2009) found that age had a moderating effect on EE and SI. In this study, age only had an association with SI. The lack of an association with EE may be because the respondents belong to the same group, all of whom are knowledgeable in using technology to support their learning.

Results of this study were also echoed by Ngampornchai & Adams (2016), who examined the acceptance and readiness for eLearning of students from Northern Thailand. Gender differences also had a moderating effect on SI. The significance of SI on males' BI was attributed to their higher familiarity with mLearning technology. In this study, there were more male than female respondents under the ICT strand. This could be a possible explanation for their higher SI score. Since all the respondents had prior experience with eLearning technology, the relationship between experience and the UTAUT constructs was not examined due to a lack of variability in the results.

While results of this study showed that SHS sociodemographic profile is associated with some of the UTAUT constructs, further studies need to be done in order to validate these claims.

UTAUT Constructs as Predictors of Behavioral Intention

Logistic regression was used to model the UTAUT constructs as the independent variables and the behavioral intention as the dependent variable (Table 5).

Construct	Coefficient	Standard error	p-value
Performance Expectancy	-0.3967	0.1118	<0.0001
Effort Expectancy	0.1552	0.0972	0.110
Social Influence	-0.1011	0.1100	0.358
Facilitating Conditions	0.0656	0.1153	0.570
Hedonic Motivation	-0.0758	0.1004	0.450
Price Value	-0.0065	0.1202	0.957
Habit	-0.03733	0.0958	0.697

LR chi squared = 32.42 ($p<0.0001$); Pseudo-R^2 = 0.1409.

Table 5. Relationship between UTAUT factors and Behavioral Intention

Results showed that, of the UTAUT studies, only PE was a significant predictor of behavioral intention. Behavioral intention decreased as performance expectancy score increased. In this study, higher performance expectancy scores denoted more disagreement with the construct. This meant behavioral intention decreased as respondents' perception of performance expectancy became more negative. Therefore, respondents who had a more positive performance expectancy – those who believed eLearning would help them achieve their academic goals – were more likely to have a behavioral intention to pursue tertiary education through eLearning.

In eLearning acceptance studies, PE has been found to be a consistent predictor of behavioral intention (Wang et. al., 2009; Thomas et. al., 2013; Wijewardene et. al., 2018). Usefulness can motivate behavioral intention (Ngampornchai & Adams,2016). This is also consistent with the original UTAUT study, which posits PE to be the strongest predictor of BI among all the constructs (Venkatesh, et. al., 2003).

Contrary to previous studies, EE, SI, FC, HM, PV, and H were not significant predictors of BI. The perceived effort needed to use eLearning, as well as the opinions of other people on eLearning, was not a significant predictor of behavior. The same goes for the lack or presence of resources, support, or knowledge necessary for eLearning; enjoyability of eLearning; and monetary cost of eLearning. Even the degree to which eLearning technologies was integrated in the lives of the respondents was not significant.

In the case of EE and H, these constructs may not influence BI because the respondents all had high computer self- efficacy. They habitually used technology to support their learning and have regular experience with eLearning applications and services. Two of the three statements used to estimate PV were neutral. This denoted a lack of knowledge on the monetary costs required for eLearning.

Conclusions

This study sought to determine the acceptability of eLearning for tertiary education among SHS students. Both descriptive and inferential statistics were used to analyze the data obtained using a survey questionnaire.

There were slightly more females than males among the respondents. Aged between 17-21 years old, the SHS students all had prior experience with using eLearning technologies. Overall, they had a positive perception of eLearning technologies, being in agreement with all of the UTAUT constructs. Majority of them had a positive behavioral intention; meaning, they were willing to take tertiary education online.

Correlation and regression analyses were used to determine if the sociodemographic profile had a moderating effect on the UTAUT constructs, as well as if the UTAUT constructs were predictors of behavioral intention.

Age and sex were each found to have a weak association with only one construct – HM and SI, respectively. Older respondents were more likely to find eLearning technologies enjoyable. Male respondents were also more likely to have significant others who had a positive impression of eLearning technologies. Prior experience with eLearning technology was part of the

sociodemographic profile. However, since all the respondents had a positive response to the variable, it was not correlated with the UTAUT constructs due to the lack of statistical variance.

In terms of the constructs' predictive capability when it comes to behavioral intention, only PE was found to be significant. Respondents who had a more positive performance expectancy – those who agreed that eLearning technologies would increase their productivity and have a positive effect on their studies – were more likely to have a positive behavioral intention for online tertiary education.

This research provided the information regarding the factors affecting users' acceptance of eLearning. This will enable educators to design online curricula or programs that cater to the needs of the potential students. It will also help eLearning institutions in the process promoting their courses to the possible influx of higher education students.

Recommendations

Results of this study showed that most of the respondents lacked enough knowledge about eLearning technologies and eLearning in general. Specifically, they had little to no knowledge about the system of learning in an online learning environment; how classes would be conducted, how they would participate, and how they would be assessed. For this reason, they were unsure if eLearning would be a good fit for them. However, almost a third of the respondents were willing to take their undergraduate degrees through an online learning institution.

Since performance expectancy or the belief that eLearning would be conducive to their academic goals was found to have a significant relationship with the respondents' behavioral intention, the following were recommended for eLearning institutions or eLearning practitioners:

1. Future information, education, and communication (IEC) campaigns should be more detailed in terms of conveying how an eLearning system works;
2. IEC materials should give more focus on how students can achieve their academic goals through eLearning;
3. In the development of online undergraduate programs, course developers should consider the accessibility of resource materials and ensure that student support is available;
4. As a consideration for future courses or even existing courses, ensuring a collaborative, engaging, and interactive environment is important; and
5. In terms of course implementation, a visible teacher presence is vital to encourage student success.

The results of this study were limited to its respondents. Moving forward, future research studies may consider the following directions:

1. A follow-up study may be done where the respondents' actual use behavior is also examined. In this way, the observed relationships between constructs may be confirmed;
2. SHS students' academic strands may influence their intention to take tertiary education online. Future studies may collect data on this factor as part of the sociodemographic

profile. Whether or not the academic strand has a moderating effect on the UTAUT constructs or on behavioral intention can be studied;

3. In terms of data collection, indirect determinants of behavioral intention such as computer self-efficacy and computer anxiety may also be included in the variables to be tested. Considering respondents' attitude towards eLearning may also increase the explanatory power of the study;
4. For data analysis, other statistical methods may be used. To be specific, other regression models may be employed; and
5. The effect of perceived risk on Filipino students' behavioral intention regarding eLearning may also be studied.

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Developing Facebook as an Accessible and Inclusive Online Personal Learning Platform: Ubiquity is Key

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Abstract

A myriad of online personal learning (OPL) platforms has been developed over the past few years in order to address the burgeoning demand for avant-garde learning environments. These online learning portals have been developed to engage 21st century learners through interactive media, advanced study tools, and other innovative applications. In the Philippines, however, the use of these popular learning platforms is not fully realized. The challenge lies in the accessibility and inclusivity concerns of these OPL platforms and other related issues such as application restrictions. With this, learners especially from marginalized and differently-abled communities have difficulty accessing popular learning portals. Therefore, this study proposed that Facebook be developed as an accessible and inclusive OPL platform as its impact as a collaborative learning space was greatly realized. This was further supported by related studies and personal experiences of the author as an educator and as an open and distance learner. Facebook, as the most popular online medium today, had undoubtedly become a pervasive global informational hub and thus this study posited that it may be considered as a breeding ground for collaborative learning and knowledge creation. Since educational professionals and system developers were focused on constructing new learning platforms, the potential of Facebook as an OPL platform was deemed overlooked. This paper argued that developing an existing ubiquitous social media platform such as Facebook, can better address accessibility and inclusivity issues rather than building new learning systems which posed more constraints to different types of educators and learners in the Philippine context.

Keywords: *Facebook, online education, e-Learning, learning management system, social media*

Introduction

A myriad of online personal learning (OPL) platforms has been developed over the past few years in order to address the burgeoning demand for avant-garde learning environments. These online learning portals have been developed to engage learners in the 21st century through interactive media, advanced study tools, and other innovative applications. OPL platforms may also be considered as Learning Management Systems (LMS). LMS enables learners to access different course sites and customize the online learning environment.

With the rise of educational modernizations, such as open and distance learning, blended learning, flipped classroom, and virtual classroom, it is important to address the accessibility and inclusivity issues that are posed by popular OPL platforms, like Blackboard, Moodle, and Edmodo, particularly in the context of the Philippine educational system. Furthermore, it is necessary to explore the potential of ubiquitous social media to be developed as an OPL platform as it will be able to address the digital disconnection experienced by marginalized communities and differently-abled communities in the Philippines.

Established on February 23, 1995, the University of the Philippines Open University (UPOU), as published in their official website (https://www.upou.edu.ph), is the first school to lead the offering of open and distance education in the Philippines. UPOU has, indeed, revolutionized open and distance education in the country and its influence is breaking boundaries as the number of online and distance learners have increased phenomenally. The Philippines' Commission on Higher Education (CHED) considers UPOU as the National Center of Excellence in Open and Distance Education. Moreover, the Information Technology and e-Commerce Council designated UPOU as the National eLearning Competency Center of the Philippines. Asia-Pacific Economic Cooperation (APEC) Digital Opportunity Center also included UPOU's virtual classroom, MyPortal, in the Top 10 Best in e-Practice list.

UPOU uses Moodle as a platform for the MyPortal LMS in offering diploma and non-diploma courses. As the premier university that offers open and distance education, UPOU's use of Moodle gives the LMS platform added prestige. However, there have been accessibility and inclusivity issues encountered with this platform. I have encountered these issues personally as I have finished courses under the UPOU and I am currently enrolled in doctoral studies under the same institution.

As an online learner and also as a teacher who frequently interacts with students online, accessibility and inclusivity are important. Accessibility refers to effortless viewing or retrieval of learning materials and information available online. Inclusivity refers to presenting learning content in different modes to cater to different types of learners, especially the differently-abled. Blackboard, Moodle, and Edmodo are accessible LMSs, but there is more to improve in that area, considering the situation of the Philippines's Web interconnectivity. As far as inclusivity is concerned, more developments and improvements must be made to cater to differently-abled online users. According to Scott (2018), accessibility is a prerequisite for an inclusive Universal Design for Learning (UDL):

> An accessible learning environment is a necessary first step to a more inclusive experience for all students. By addressing accessibility issues upfront, instructors can also move towards implementing UDL principles in their courses. The UDL guidelines emphasize providing students with multiple means of representing learning content, of engaging with course content and each other, and for expressing their understandings. Accessible content is characterized as flexible and usable. It can be quickly transformed into different formats like audio and HTML, supporting instructors to represent learning content in diverse ways and allowing students to engage with content using different modalities and devices.
>
> These kinds of personal needs and preference settings are also a point of emphasis in the IMS Global Learning Consortium accessibility standards. Interoperability, for example, can allow for preference settings to be applied across the LMS experience without interruption. With a robust analytics architecture, instructors can make informed recommendations to students about the kinds of content and activities that might work best for them, and offer students more options in exploring different learning pathways.

In the Philippines, however, the use of these newly-developed learning platforms like Blackboard, Moodle, and Edmodo is not fully realized. The challenge lies in the accessibility and inclusivity concerns of these new OPL platforms and other related issues such as application restrictions. We have to consider that these OPLs are easily accessed by learners in highly technologically

advanced communities in different parts of the globe. Some developing communities may have access to these OPLs, but it would be limited to the cities or to families who have the means to avail of prepaid or postpaid Internet packages. In developing countries like the Philippines, good connectivity or access may only be easily acquired by those who belong to the more privileged communities. There is, therefore, a digital divide that exists and this is a deterrent to equal access to online learning opportunities. Most learners, especially in marginalized communities, have difficulty accessing these popular learning portals due to, for instance, the cost of mobile Internet usage. They depend on free Wi-Fi access points but most of the time, connectivity to these spots are limited due to the high volume of users.

In addition, it was recently reported by the Department of Education (DepEd) (Alcober, 2018), that 74% of Philippine public schools do not have Internet connection yet. Only 26% of the 46,000 public schools nationwide have access to the Internet. In spite of this, the government is putting its efforts in providing Internet connection to all public schools. According to DepEd Undersecretary Alain Pascua, the government allotted an initial budget of Php 1 billion for this year for Internet connectivity. Pascua claims that this budget is too small as it can only cater to 10,000 schools. Some cities in the Philippines already have Internet connection so the priority lies in the remote or far-flung areas of the country. The poorest schools or "outskirt schools" are the first to receive the Internet connectivity service. Likewise, DepEd has also distributed 462,114 computer packages to about 35,241 schools. This has benefited 14,289,301 students and 451,118 teachers.

On a related note, Department of Information Communication Technology (DICT) acting Secretary Eliseo M. Rio is eyeing to install 8,000 Wi-Fi hotspots across the Philippines this 2018. Two public biddings were done for the project and the budget for this project is Php 1.6 billion. The Act Establishing the Free Internet Access Program In Public Places in the Country and Appropriating Funds Therefor (RA 10929) signed by President Rodrigo Roa Duterte aims to provide free Internet access in public places such as parks, hospitals, schools and government offices, and terminals. DICT is eyeing to have 200,000 access points by year 2022. Rio claims that this project is "the biggest free Wi-Fi deployment in the whole world". Moreover, it was reported that a Wi-Fi's access point's "size, speed, and bandwidth allocation will depend on the size of the site and the number of concurrent users in the area. Some Wi-Fi access points like universities will have 100 Megabytes (MB) of allocation while other spots will have 10 to 20 MB (Alama, 2018). The Philippines' status as of the moment is still far from the ideal situation in terms of Internet connectivity, but, at least, gradual changes are being seen that are necessary to reach the ideal state. The ideal is for everyone, regardless of societal class and location, to have free and unrestricted access to these OPLs for continuous and more meaningful learning.

Since Filipinos are reportedly the most active social media users, developing Facebook as an accessible and inclusive OPL can instantly attract many users, especially those who belong to marginalized and differently-abled communities, to take advantage of greater online learning opportunities.

Objectives

This research paper discussed the issues and possibilities of popular OPL platforms as observed and experienced first-hand. This study also explored the potential of developing Facebook as an accessible and inclusive OPL which was known as Facebook Classroom in the context of the Philippine online classroom. It proposed the collaboration of the Philippine government, the two major telecommunication networks Smart Communications and Globe Telecom, the Facebook Management, application developers, educators and students to develop Facebook as an OPL platform. It also recommended to further make the medium accessible and inclusive in order to cater to a wide range of learners. This paper also probed the challenges of developing Facebook as a potential accessible and inclusive OPL system, giving primary focus to the Philippine educational context.

Review of Related Studies

The potential of developing Facebook as an accessible and inclusive OPL platform is supported by previous studies that realize the impact of the ubiquitous social networking site to different sectors of the global nation. This further solidifies the foundation for this social media platform's classroom function to be developed to reach a wider variety of learners.

According to Rojas-Kramer, Esquivel-Gamez, & Garcia-Santillan (2015), Facebook, as a social networking site, was not primarily designed to manage learning experiences. It was built to establish interactions which aimed to connect family and friends worldwide. It was merely used for socializing purposes until new ideas and trends in society transformed the identity and function of Facebook. The establishment of Facebook became a popular platform for business opportunities and of course, innovative opportunities in the educational sector.

Facebook established itself as a social networking site in 2004 and as it gained much traction, it became a global phenomenon that helped people create connections like never before. Facebook greatly aided businesses and various organizations in reaching the global market. With Facebook's powerful impact in engaging people from different backgrounds, it was not surprising that it built a collaborative space for educators and students. Casey & Evans (2011) believed that social networks played an important role in various learning institutions today. Facebook, as the most popular social networking site, attracted many students and it became a platform for collaboration. Moreover, digital literacy was a prerequisite to further engagement in social networks. This entailed awareness about the different functions that Facebook possessed, as well as the awareness of Internet jargon that was encountered as one engaged in online correspondence.

Digital literacy was actually recognized as a key factor in economic development as this involved skills that were linked to educational opportunities and employability ("The Philippines Places Digital Literacy at Centre," 2018). Digital literacy was expected to be high for the digital natives who were born into a world already filled with numerous technological advances and had access to social networking sites that not only contain entertainment content but also informational or educational content.

Dolphy (2015) also discussed the advantage of social network sites as a research-based pedagogical technique (RPT). It was observed that teachers were able to easily incorporate and

share multimedia through these social network sites. This, therefore, provided "a rich content experience that accommodates learning styles and preferences." Moreover, social network sites also "provided a collaborative learning environment that was not bound by time constrictions, allowed for informal learning opportunities to increase, and supported active knowledge construction through interaction with experts as well as peers" (Dolphy, 2015). This further supported the thrust of open and distance learning programs that were growing in number especially that Facebook, as a learning space, cultivated a discursive atmosphere.

According to Eteokleous (2012), it was noted that because of the use of social networking sites, lecturers were able to continuously connect with their students. Students also benefited from these sites as it improved their collaborative activities, such as: informing and updating them about assignments and upcoming events; providing useful links and samples of work outside of the classroom; sharing educational material and even providing some general information. In addition, social networking sites helped students stay in touch with their classmates - they helped each other with their class assignments or examinations, addressed any questions and concerns, and collaborated on assignments and group projects. The frequent use of social networking sites by students and the sites' unique collaborative features (Web 2.0 tools) allowed for the development of beneficial educational contexts and was pedagogically promising to both educators and students. The social networking environment engaged students in a new and innovative way. Social networks enhanced communication, collaboration, sharing, student motivation, effective learning, and the classroom climate by offering students opportunities to come "virtually closer" to their educators and classmates. The study began to fill the gap that exists in the literature on whether social networking sites can promote, enhance, and support the teaching and learning process. It demonstrated the educational benefits of social networking sites by using them for either educational purposes and/or creating special educational interest groups.

Compared to popular LMSs like Blackboard, Moodle, and Edmodo, there was much greater interaction in social networking sites such as Facebook, as this social medium was like a one-stop shop that let users take advantage of private communication through Facebook Messenger, and at the same time, a more public feature which is the Facebook wall where users can share different content and collaborate with others. In addition, the Facebook Groups function helped organize different social groups. This made Facebook a much more practical choice for educators and learners as they only used one application to access personal and educational content.

Furthermore, in Eteokleous's (2012) study regarding the use of social networking sites which employed a mixed method approach in studying the responses of 232 students from five universities in Cyprus (University of Cyprus, Technical University of Cyprus, University of Nicosia, European University, and Frederick University), it was found out that "Education" was one of the important reasons why students logged into Facebook. This showed that students recognized the "potential educational value of the social networking sites, giving the positive message that it was possible to educationally exploit social networking sites." The study also revealed that social networking sites such as Facebook increased the likelihood for teacher-student and student-student interaction. Because of the pervasiveness of Facebook, students easily connected with their teachers even if they were outside the four walls of the classroom.

Facebook's ubiquity was, indeed, a powerful force in engaging people into discussion that was why its classroom mode or function should be developed to cater to different kinds of learners.

With the proliferation of gadgets and gizmos, the world was within one's reach. In the recent Digital in 2018 report this January, it was noted that the number of the world's Internet users already surpassed the 4 billion mark. This became possible due to the influx of more inexpensive smartphones and mobile data plans. The number of social media users in 2018 reached an astounding 3.196 billion which was up 13 % year-on-year (Kemp, 2018). With this figure, it was imperative that Facebook's classroom function be developed in order to create more accessible and inclusive online environments for learners in the Philippines.

Methodology

The study employed qualitative research methods to observe and analyze issues with popular OPLs like Blackboard, Moodle, and Edmodo amid the digital divide in the Philippines. It served as significant foundations to support the development of Facebook as an accessible and inclusive OPL platform. The situations observed in the current and previous classes I experienced as an online learner and educator and data from related studies were used as bases for the construction of this study. Since Facebook is a ubiquitous social media platform popular even in students, the use of the Facebook Groups function as an LMS for each of my classes was also used as foundation for developing this research. Since I started handling college courses in 2015, I noted observations from my experiences in handling 21 Facebook Groups created to be used as an LMS. With this, observations and recommendations for the development of Facebook's classroom function were deemed necessary. This paper argued that developing an existing ubiquitous OPL platform, such as Facebook, can better address accessibility and inclusivity issues rather than developing popular LMSs or building new LMSs which pose more constraints to different types of educators and learners in the Philippine setting. I also included further discussion in the incorporation of additional study tools in Facebook to make the system's overall classroom function a viable platform for more online personal learning opportunities. Furthermore, I proposed that this accessible and inclusive OPL platform to be developed be called Facebook Classroom.

Results and Discussions

Issues and Possibilities of Popular OPL Platforms

One of the most popular learning management systems, Blackboard, Inc. founded by Stephen Gilfus, Daniel Cane, Michael Chasen and Matthew Pittinsky in 1998 (Leibovich, 1999) was a revolutionary learning application which has greatly developed into an award-winning digital platform for learning. It garnered the 2018 IMS Global Learning Impact Award for outstanding achievement in the arena of Educational Accessibility and Personalization. The Blackboard application enabled students to keep track of their coursework with the use of study tools to maximize learning. It alerted students with coursework assignments through the calendar incorporated in the application. It also enabled students to engage with their instructors and their fellow classmates through online discussion and private messaging functions. This platform allowed students and teachers to share different types of content that were helpful in supplementing lessons. The application also gave feedback to students on their academic performance through quizzes or tests as well as other graded activities within a course. It was also beneficial to teachers as they were able to keep track of each student's progress. The different study tools helped teachers in creating, administering, and marking tests easily. Blackboard described its systems as "striking, clean, accessible, efficient, and engaging." It presented itself as modern, open, simple, and

powerful.

Another breakthrough in the arena of LMS is Moodle which was established in 2002 by founder and CEO Martin Dougiamas. Moodle was a free and open-source LMS and it was also one of the popular platforms used in online education today (Rogers, 2009). Much like Blackboard, it provided a learning space for students to engage in discussion through forums and messaging functions. It also had a function that reminded students about upcoming deadlines to help them keep track of their coursework progress. Through the Moodle platform, students were able to submit assignments online and teachers are also able to create, administer, and mark online tests. Although Blackboard possessed a much more sophisticated system, Moodle had the potential to perform the functions that its contender offered as long as it could address the needs of its learners by updating the system with the current technological advances in online education. Moodle described its system as a "single robust, secure and integrated system to create personalized learning environments."

Edmodo, founded by Crystal Hutter, Jeff O'Hara, and Nic Borg, was an innovative LMS which debuted in 2008. This platform provided a free social network for a large number of educators. Since then, it had catered to 36 million teachers and students from over 220,000 schools. Its system allowed third-party developers to help users take advantage of their applications on the Edmodo platform (Wan, 2014). Similar to Blackboard and Moodle, Edmodo enabled students to keep track of their coursework activities through notifications. Edmodo's design was similar to that of Facebook's features. It enabled teachers to easily post assignments, create, administer, and mark tests. Students were able to engage with their classmates and teachers through online discussion as one would do in Facebook. The system presented a simple and user-friendly interface compared to Blackboard and Moodle. Edmodo described their platform as a "safe, customizable digital classroom."

These OPL platforms operate under a social constructivist environment (Rogers, 2009) wherein knowledge about different ideas was created and developed as interactions were formed. This was evident in class interactions and also in discussion forums in online learning spaces (Lynch, 2016). Having these OPL platforms contributed to the development of student learning through online discussions and content sharing. Teachers were also able to develop students' critical thinking skills through a question prompt. The variety of ideas that students generated through these platforms were astounding as these would have been impossible in the traditional classroom setting. With these developments in cyberspace, learning was, thus, revolutionized. Blackboard, Moodle, and Edmodo, indeed, changed the way students learn and the way teachers facilitate learning. The different learning and study tools incorporated in these online personal learning platforms catered to the 21st century learners who were tagged as digital natives. Just as products and services should be customer-oriented to satisfy its clients, these OPL platforms needed to be constantly improved to satisfy its users.

Looking at the context of the Philippine classroom, considering learners who are from marginalized and differently-abled communities, an issue with these popular OPL platforms was that students were not able to download these applications because of limited Internet access. On the contrary, if they were able to connect to the Internet, some students sacrificed other applications in order to accommodate new OPL applications needed for their particular subject. Other times, other students did not want to delete other applications and refuse to download the new OPL application. In some instances, when students were able to download the required OPL platform, there was less interaction in the discussion forum because some mobile gadgets have

compatibility issues with the application. Other than that, the use of OPL platforms like Blackboard, Moodle, and Edmodo became a hassle as students needed to switch applications when interacting with classmates. It was much easier to reach others through Facebook or Facebook Messenger. This was, indeed, an evident scenario from what I experienced as an online learner using Moodle for my doctorate classes. My classmates and I communicated more frequently in Facebook and Facebook Messenger rather than in Moodle. Moodle became the site for posting and submitting assignments while Facebook and Facebook Messenger served as the quick-response medium we used when we had queries about our assignments or whenever we had group works. This could be avoided if all these functions were incorporated in a ubiquitous and widely-used application.

If Facebook were to be developed as an OPL platform, it would lessen the instances of switching applications just to accomplish certain coursework tasks. If Facebook had the study tools that were available in popular OPL platforms or LMSs, learning will be much more convenient for students and it will also be helpful for teachers' facilitation of classes. Moreover, since Facebook is ubiquitous in almost all students' gadgets, it is a viable platform that can be developed as accessible and inclusive OPL for the Filipino learner.

Facebook as an Accessible and Inclusive OPL Platform

Related research on the use of social networking sites such as Facebook proved the practical advantage of this platform if it were developed as a potential accessible and inclusive OPL platform. Facebook, as the most popular online medium today, undoubtedly became a pervasive global informational hub and thus, it was considered as a breeding ground for collaborative learning and knowledge creation. While educational professionals and system developers were focused on constructing new learning platforms, the potential of Facebook to be utilized effortlessly as a learning space was deemed overlooked.

In order to address the accessibility and inclusivity issues in online learning, I propose for the development of an existing and ubiquitous online medium, Facebook, into an OPL platform to benefit marginalized and differently-abled communities, primarily in the Philippines. Moreover, according to We Are Social's Digital 2018 Report, the Philippines earned the top rank in the greatest amount of time on social media. Filipinos were reported as the most active social media users, that they spent almost 4 hours on social media every day (Kemp, 2018). This information gave us all a stronger foundation to take advantage of Facebook's ubiquity and engaging power to develop it as an online learning space for Filipino learners. Facebook's ubiquitous nature was seen as the key feature that makes it a viable platform for educational learning environments.

Since the Philippine government was gradually working on providing information and communication technologies (ICT) resources to public schools, and at the same time, working on the country's Internet connectivity, I believe that the major telecommunication networks Smart and Globe can help alleviate the accessibility and inclusivity issues in online learning. Facebook had coordinated with mobile networks such as Smart and Globe to be able to provide discounted or free mobile data access to Facebook and Facebook Messenger to its users. Given that both telecommunication networks provide an array of mobile data packages, the free data service was a suitable foundation for Facebook to operate as an accessible and inclusive OPL platform. In the free data feature of Facebook, users were able to view online posts that came in the form of text. Users who were on free data mode were not able to view photos and videos but part of the proposal implied that efforts will be done by the government and major telecommunication networks in collaboration with Facebook management to address this issue, especially that this will benefit marginalized and differently-abled communities.

The use of Facebook Groups in facilitating classes had immensely helped in class management. It also encouraged more students to engage in online discussion. In my experience in organizing 21 Facebook groups for all my classes since 2015, I noticed that students were able to view my posts easily and quickly.

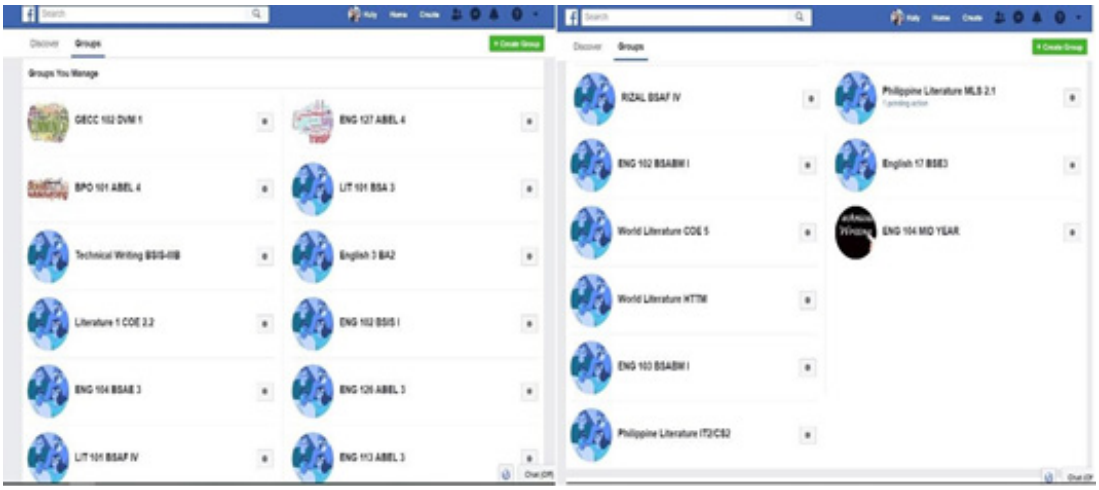

Figure 1. Facebook groups created for learning management

There was little to no objection when I required students to join the Facebook groups I created because they already had the Facebook application installed in their mobile devices and they visited the website frequently. There was almost no complaints or problems from students on access to the Facebook groups I created for each class. In addition, students were able to respond to my posts with minimal issues and the application greatly engaged the learners to discuss ideas through the comments section of each post. I also observed that student responses were often quicker in Facebook. Furthermore, students were able to use the private messaging function of Facebook Messenger to reach their mentors to ask queries, to give information about certain academic or personal matters, or to submit an assignment.

In the perspective of an educator, sharing of information was much easier to do in Facebook since I did not have to switch applications when I accessed it using my mobile devices. It was also easy to post information using the desktop version as familiarity with the platform was already established. I was able to create a work-life balance in just one application. I was able to post updates anytime and in any place as long as there was decent Internet connection. It had been very helpful in information dissemination especially when there were urgent announcements to be posted. Most of my students were able to access my posts and were able to inform their classmates who were not online. I was able to post different content such as text, photos, videos, or links easily. Students appreciated the Facebook group function as they were able to check for updates easier and they were able to have an organized learning space. In that case, retrieval of information or study materials posted in the group was much easier.

With accessibility and inclusivity issues of the popular LMSs or OPL platforms like Blackboard, Moodle, and Edmodo, it was better to develop Facebook, an existing and ubiquitous medium that was already proven effective at reaching a wide range of learners, especially in the Philippine setting. The plan was to develop Facebook's classroom mode, which may be simply called Facebook Classroom, to feature study tools and applications that would be at par with popular

LMSs like Blackboard, Moodle, and Edmodo. This was, of course, going to be possible with the intervention of the government and the private telecommunication sectors such as Smart and Globe that will provide the free data feature for Facebook Classroom. Moreover, it was proposed that Facebook Classroom be developed to be more inclusive in order to cater to differently-abled learners. This meant that Facebook Classroom will also feature an inclusive mode which will help learners with visual impairments, hearing impairments, navigation difficulties, and overstimulation issues ("Web Accessibility and Making Your Website Disability-Friendly," 2017).

Some key areas that Facebook Classroom should include are calendar notifications for upcoming deadlines, to-do lists, test creation, administration and marking functions, assignment submission bin, journal, gradebook, and discussion forum function.

Facebook Classroom's Challenges

On the other side of the spectrum lay the challenges and drawbacks of using a social networking site as a platform for proposed online LMS called Facebook Classroom. Developing Facebook as an accessible and inclusive OPL platform was found to pose some risks like any other online social medium. Facebook's pervasiveness was also deemed as its weakness as it became a vulnerable target for online threats and security issues such as hacking and identity theft.

Another challenge that the proposed OPL platform may face is the probability that Facebook Classroom notifications pop-ups may trigger anxiety and stress which may prompt students to ignore the notification. This may become a case of Pavlovian classical conditioning as they associate the Facebook Classroom notification to impending tasks to complete. In addition to this, since the OPL platform was proposed to be incorporated within a social networking site, students may be distracted in their accomplishment of assignments as they may be tempted to spend more time on their personal Facebook and Messenger accounts that feature posts and messages from their friends.

Given the status of the Philippines wherein most schools were not yet fully connected to the Internet and Wi-Fi hotspots were yet to be installed in different parts of the country, maximizing the use of the proposed Facebook Classroom may be hindered. The government sectors, particularly the DICT, in partnership with the two major telecommunication agencies Smart and Globe, should work together to be able to provide free data access to learners of the Facebook Classroom in order to accommodate students from different communities, most especially those from marginalized communities. When the accessibility of Facebook Classroom is well-established, the inclusivity function or inclusive mode of the OPL platform will be next in line to be developed. The need for an accessible and inclusive online learning space will call the attention of the Facebook management and also application developers, and experts who work with differently-abled learners. This will ensure that the Facebook Classroom is built to provide better user experience for different types of online learners.

Conclusions and Recommendations

In conclusion, the accessibility and inclusivity of the popular OPL platforms such as Blackboard, Moodle, and Edmodo were not yet fully realized in the Philippines as there was a digital divide that exists within the society. Unless the government sectors and major telecommunication sectors continued to improve their efforts in paving the way to provide free data access for the Filipino people, especially those from the marginalized communities, more learning opportunities were in store for the a diverse group of learners.

Rather than utilizing Blackboard, Moodle, and Edmodo, and other LMSs that posed accessibility and inclusivity issues, it was proposed that an existing ubiquitous OPL platform such as Facebook be developed to cater to diverse groups of learners. Rather than building new learning systems which posed more constraints to different types of educators and learners, it was recommended to develop Facebook instead as this platform is proven to reach a wide range of users even in the global level and its familiarity among online learners made the application or website contribute to its user-friendliness. The proposed name for this OPL platform was Facebook Classroom. Facebook's ubiquitous nature was, indeed, proven to engage a large network of online learners, thus, it built a stronger foundation for the development of Facebook Classroom.

Developing Facebook as an OPL platform offered many advantages as this medium provided an avenue for quick feedback in student-student interactions, student-teacher interactions, and teacher-teacher interactions. Furthermore, it was recommended to incorporate additional study tools in Facebook Classroom to improve the system's overall classroom function to make it a viable platform for more online personal learning opportunities. Facebook Classroom shall also feature an inclusive mode which will help learners with visual impairments, hearing impairments, navigation difficulties, and overstimulation issues as they engage in online academic pursuits. The development of Facebook Classroom would most certainly change the online learning culture as it will attract many educational groups or institutions to take advantage of this free service which is hopefully going to be worked out by the Philippine government and major telecommunication networks in partnership with Facebook management. Facebook is a highly practical choice for educators and learners as they will only use one application to access personal and educational content. On the other hand, Facebook, like any other online social networking site, faces security threats, but this can be overcome by increasing the efforts in enhancing its security and safety features.

Therefore, Facebook is a potential OPL platform that poses more practical advantages than the popular and newly-developed OPL systems. Learners who use Facebook as an OPL medium may have some issues with the application, but the benefits of developing it as an OPL platform outweigh its disadvantages. With previous studies proving the great impact of Facebook as an effective learning space, it is highly recommended that Facebook Classroom be developed as an accessible and inclusive OPL platform to cater to a diverse group of learners, primarily in the Philippines.

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Constraints on the Use of a Learning Management System in a Blended Learning Environment

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Abstract

This research investigated the blended learning environment constraints when academics use a learning management system (LMS). With the prevalent use of educational technologies including the LMS, a mix of traditional face-to-face and web-based technologies became an alternative mode of instructional delivery in higher education. However, despite of the reported benefits in many studies about the use of LMS, the uptake of using the system was not maximized by students and by academics. The problem this research sought to answer was: what were the constraints encountered by the academics in a blended learning environment? This investigation was conducted in a state university based in Mindanao, Philippines. Thirty-three academics from different disciplines and professorial levels participated in this study. The LMS used in this university was Moodle and records of computer logs indicated that only 30% of academics used the LMS. Two major processes were carried out in this investigation. Firstly, a qualitative approach which employed a one-hour, one-on-one in-depth interview with each participant was conducted. Data were then transcribed and coded in three stages: open, axial, and selective coding. Qualitative data were analyzed using a grounded theory approach. Secondly, a quantitative approach, using descriptive statistics was used in the analysis of the participants' computer logs which were gathered and processed using a simple data mining procedure. The findings in this study suggested that academics had been experiencing difficulties in delivering courses in a technology-enhanced learning environment particularly with the use of LMS. Difficulties in time management, curriculum level, students' access, and economic viability were found to cause the constraints.

Keywords*: learning environment, constraints, learning management system, blended learning*

Introduction

Web-technology has become a buzz word in the learning-teaching environment. Learning institutions utilize technological tools, such as audio and video devices to help academics and students in their lessons. As research trends have shown, "the use of the Web over the last decade has begun to dominate tertiary education" (Moore, 2007). The mix of delivering courses in a traditional classroom and the provision of electronic courseware resources has developed the notion of a blended learning environment. This environment has incorporated not only audio and video resources, but also web technology such as a learning management system (LMS). Along with the shift to learner-centered approaches to teaching and learning, this paradigm shift is challenging to both academics and students, opening opportunities for research in this field. Research and development agenda for educational technologies outcomes are geared towards all sectors in the educational context; however, several studies on blended learning environments have focused only on the learning outcomes of students. Studies on academics' readiness to use, or even actual use of technologies are scarce. Teaching in a blended learning environment needs specific skills that are aligned with technological, sociological, and pedagogical contexts.

Many studies have attested to the importance of teaching presence for a successful online learning (e.g., Garrison & Cleveland-Innes, 2005; Shea, Pickett & Pelz 2003; Swan 2004). In a different study, Shea et al. (2006) conducted an extensive investigation of teaching presence and online learning wherein 1,067 online students across 32 institutions were involved. Shea colleagues (2006) developed a survey instrument to measure students' perception of teaching presence. Using factor and regression analysis, it was found that students' recognition of effective "directed facilitation" (p. 182) and effective instructional design and organization on the part of their teacher contributed to their sense of shared purpose, trust, connectedness, and learning. Although the biggest challenge among students' adjustment relates to issues of interaction – both socially and cognitively (Angeli, Valanides & Bonk, 2003), the consensus from these studies is that teaching presence is an important factor for student satisfaction, perceived learning, and sense of community (Garrison, 2007). While social presence among students were developed through interaction, teacher presence – through its facilitation function - is vital to the success of higher-order learning in an online learning environment (Garrison, 2007).

However, the question, why do some teachers have issues when using the LMS for their classes is posed. This concern will be answered in the succeeding discussions.

Objectives

The main objective of the study was to investigate the constraints encountered by the academics in a blended learning environment. More specifically, this study sought to discover the issues and challenges encountered by academics when delivering classes in blended mode and verified claims based on computer log analysis.

Review of Related Studies

Two issues were found prevalent in a blended environment setting: personal and environmental. Acceptance of the system, motivation, skill level, and time management, among others pertained to intrinsic constraints (Giardina, 2010; Lameras et al., 2012). Personal issues were intrinsic constraints within the control of the user, such as his/her attitude towards the system, or the effect on him/her when using the system. However, intention to use can only be justified if the user had actually used the system, not only intending to use it. A major barrier to academics' adoption of information technologies was the academics' lack of knowledge and ability to integrate the technologies into their teaching practices (Thomas & Stratton, 2006). Both studies had found that a major barrier to academics' adoption of information technologies was academics' lack of knowledge and ability to integrate the technologies into their teaching practices. These had a strong impact on academics' non-confidence on the usefulness of the technologies and their reluctance to use the technologies (Anderson, 2008). In Bolliger and Wasilik's (2009) study, they examined the factors influencing faculty satisfaction. Results of their study confirmed that there were three factors affecting satisfaction of faculty in an online environment: student-related, instructor-related, and institution-related factors. The results in Bolliger and Wasilik (2009) implied that there were constraints that affect the level of satisfaction. Likewise, these constraints were found to exist in the findings of this research affecting academics' system usage: learning environment, training, and institutional level. Instructor and institution-related studies of Bolliger and Wasilik (2009) had similar effects on personal satisfaction.

Collectively, extrinsic constraints were called environmental constraints. Some studies had justified the relationship between system usages of academics to environmental issues (e.g. Lin, Singer & Ha, 2010; Macharia & Nyakwende, 2010; Peszynski, and Ocak 2011). For example, Lin et al. (2010) investigated university members' use of and resistance to an information and communication technology system (Blackboard) in a higher education organization. Lin et al. (2010) employed the technology enactment framework in their case study to examine structure enactment in university members' technology use and resistance. The case study found that maximum use, enhancing teaching, augmenting service, limited use, and resistance were enacted in organizational members' interactions with the system.

Macharia and Nyakwende (2010) investigated the factors that inhibited or accelerated the adoption and diffusion of LMSs by academic staff for teaching and learning activities. Their study used a paper-based questionnaire survey completed by 82 lecturers from a selected sample of public and private universities in Kenya. The results of analysis from that study indicated that the characteristics of the Vice Chancellors/Chief Executive Officer (CEO) were important determinants of LMS adoption and diffusion by instructors in higher education. These characteristics included: keenness on modern information and communication technologies (ICTs), influence on ICTs development, and visionary ICT leadership. Results also showed that organizational variables of subjective norm, availability of ICTs, organizational support, organizational readiness, and top management support were related to behavioural intentions of academic staff to use LMS for teaching and learning. Furthermore, results suggested that top management support was found as the dominant factor in predicting the acceptance of LMS. In Peszynski (2005), the study about power and politics in a system implementation was carried out putting executive administrators in a similar context as having a crucial role in adoption and diffusion of systems. In an exploratory qualitative case study, Ocak (2011) examined the problems and impediments that faculty members encountered in blended learning environments in a Turkish Higher Education system. Results showed that faculty members' problems with blended teaching resulted in the identification of three inductive categories: instructional processes, community concerns, and technical issues. There were eight themes that emerged from these three categories: (1) complexity of the instruction, (2) lack of planning and organization, (3) lack of effective communication, (4) need for more time, (5) lack of institutional support, (6) changing roles, (7) difficulty of adoption to new technologies, and (8) lack of electronic means. The Ocak (2011) study indicated that teaching blended courses can be highly complex and have different teaching patterns. Notably, the complexity of the teaching patterns impacted the successful implementation of the blended college courses. In Garrote and Pettersson (2007), lecturers' attitudes towards LMS were examined with particular reference to identifying obstacles to increased use. It was found that when lecturers decide individually to use tools in the LMS, the major concern is the initial amount of work compared with the expected benefits.

Relating environmental constraints to the theory of constraints (TOC) was summarized in Rahman (1998) as: (1) Every system must have at least one constraint; and (2) The existence of constraints represents opportunities for improvement. Rahman explained that contrary to conventional thinking, TOC "views constraints as positive, not negative. Because constraints determine the performance of a system, a gradual elevation of the system's constraints will improve its performance (Rahman 1998, p. 337).

The above studies have identified various external and environmental problems on system usage that impede or enhance the usage of LMSs by academics. The insights of TOC are relevant when investigating about environmental constraints with academics.

Methodology

This case study utilized a qualitative-quantitative research design. This was conducted in a state university in Mindanao, Philippines offering undergraduate and graduate degree programs in the Arts & Social Sciences; Business & Accountancy; Education; Engineering & Engineering Technology; Science & Mathematics; Nursing; and Computer Science & Information Technology.

A total of 33 participants of the study were full-time academics who either had administrative load or no administrative load. They gave consent to the researchers to access their log files. They also actively participated in the open-ended interviews.

To gather qualitative data, questions related to their three most problematic issues and challenges in using LMS were asked. They were also asked what workarounds were initiated to address the issues or challenges. Moreover, they were also asked what teaching and learning strategies were practised. Analysis was done in three steps: open, axial, and selective coding based on the grounded theory approach (Corbin & Strauss, 1990).

Quantitative data were mainly gathered from the LMS database server. The university uses the Moodle (Moodle, 2012) platform for the learning environment that was customized and called as MSU-IIT Online Learning Environment (MOLE). Each of the participants' computer log files were saved in electronic spreadsheets. Log data were analysed using descriptive statistics by getting the average and median values. Moreover, in the analysis, particularly the average and median values, the level of interactions (whether high, medium, or low) were assessed.

Validation of findings

The validation process was done in two schemes: interview transcripts confirmation by participants and presentation of findings in workshops. To increase validity of the findings the interview transcripts and a copy of the findings draft were emailed to the participants. Participants were encouraged to express their views or comments by replying to the email that was sent to them. There were ten participants whose comments were received in relation to the interview transcripts. Also, findings were presented to the participants in two instances. Firstly, the results were presented to the participants of this study who had no administrative functions. Thirteen participants attended this first workshop. Secondly, another workshop was conducted with some of the research participants from the executive management level. Some attendees who were also invited composed of the deans from all colleges, as well as graduate coordinators from each college. Twenty academics attended this second workshop.

In both workshops the theme focused on the use of LMS in a blended learning environment. The participants were asked to fill-in a form created in Google Form after the question and answer (Q & A) forum – requesting them to write their comments and/or suggestions. Consequently, most of those who participated had a more positive view of blended learning environment aided with MOLE. A question was addressed by an executive administrator to the attendees present during the Q & A forum. He asked them whether they think the blended learning mode of delivery will really work at MSU-IIT. The attendees responded affirmatively.

The validation process that this study had made was a rigorous undertaking. It was an essential component of this research such that it had served as a justification of the relevance of investigating the pros and cons of using an LMS in blended or online learning environments. Moreover, by validating the results from academics, better prospects for a paradigm shift on teaching and learning process was supported.

Results and Discussions

Based on the interview transcripts that were coded and categorized as themes, four dimensions on the issues and challenges were identified.

First dimension: Time management constraints

Time management constraints had the following themes of related issues: preparation of learning materials and tests, course implementation, contact hours, compensation, and time wasted due to connectivity problems which were referenced by 25 academics in different aspects. Expounding on these issues were outlined herein.

Material preparation for blended learning was found to be more time consuming as compared to that of the traditional classroom. Most participants revealed that writing lesson notes, looking for relevant links and assessment of learning outcomes were time consuming. They said they had to be creative and had to guide students in the use of resources, making sure that the materials were useful and not deviating from the principles and flow of their topics.

While there were some participants who recognized the benefits of multimedia enhanced classroom lectures, they disclosed that it was time consuming for video recording and uploading these to MOLE. Moreover, the necessary equipment (e.g., good quality video recorder and tripod) were not available in the classrooms.

Another issue raised by the participants was the time spent in the assessment of the learning outcomes of the students. Discussing lessons online using chat and discussion forums entailed so much time for reasons like teacher-participants could not just ignore discussions of some students whose topics were not within the particular lesson discussion thread that they had to spend some time answering them. Another and more prevalent reason that surfaced was the time between comments and responses were found to lag which was attributed to slow connectivity issues.

Likewise, participants who used a teaching strategy like journals found it time consuming to read each entry from the students in big classes. Thus, they sought time-saving techniques that would allow them to communicate efficiently using these tools. They believed that they needed training to enhance pedagogical skills for online classes.

Contact time and compensation was another issue. An academic's weekly presence requires three hours of actual contact hours, (i.e., class time). At MSU-IIT, full- time academics were required to render an equivalent of 40 hours per week that includes actual contact hours, consultation with students, lesson preparation, and related tasks. An issue arose when academics conducted a blended class using MOLE for more than double the actual contact hours online.

Second dimension: Curriculum level constraints

Curriculum level constraints were related to the subject or the course handled by a participant particularly in relation to technology and non-technology driven courses. Non-technology driven courses did not require computer laboratories often such as in the Arts & Social Sciences, Nursing, and Education. Technology-driven courses were the Engineering & Engineering Technology; Science & Mathematics; Computer Science & Information Technology; and Business & Accountancy. The need for computer facilities were explicitly stated in the course descriptions of each courses. Seventeen participants said that without a laboratory component of their subject, it was difficult for them to decide to use MOLE because of the limitations on access to computers– for themselves or for their students. Most of the comments in this area were related to availability of computer facilities.

Another issue was in relation to the department or program offering. Participants raised these issues in relation to their affiliation with a specific department, school, or college. The teaching load given to each academic related to the course description and the requirements for such courses. In MSU-IIT, a course was a single subject that an academic handles. A single course had a total equivalent of three academic units. For example, one of the courses in the School of Computer Studies was Human Computer Interaction (HCI) which was described as a socio-technical course with a two-unit lecture, and a one-unit laboratory. Highly computational and technical subjects such as Engineering courses had either computer or practical laboratory components. These reasons from the participants were issues because without computer laboratories or the necessary facilities in the classroom, academics cannot use the intended teaching strategy for the course. Some participants wanted to have their learning materials in MOLE and once uploaded, they could access it in their face-to-face classes. Also, using MOLE to conduct exams in a common laboratory was an issue for most participants because they wanted to make sure that they were present and could watch over their students answering the tests to ensure validity, reliability, and trust.

Course description as a constraint related to the type of presentation that was best for a particular course. Twelve participants from problem-related or computational courses said that their subjects were different from descriptive subjects, and that teaching strategies were much different (e.g., it was important that sample solutions to the problem needed to be discussed with the students face-to-face). Most of them suggested that descriptive subjects benefited more from MOLE. This was an issue because of the varied interaction levels that academics had to perform.

There were issues related to program level which referred to the undergraduate or graduate degree courses. Of the 27 participants, 13 implied that the issues were related to program level. Most of these participants mentioned pedagogy in one or both program levels, work responsibilities, and travel incurred when taking a graduate degree course at MSU-IIT. The general notion was to choose what course was ideal for online delivery. There needed to be specific guidelines on what type of courses will be complemented by the use of MOLE.

Third dimension: Students' access and economic viability

The students' access and economic viability were mentioned by most participants. Most of them were concerned with the equitable access of students to MOLE because a large percentage of students were economically challenged. Since most students did not have their personal computers, their non-access to technology was often considered by academics as a factor that

affected their teaching performance especially when academics suggested to their students to access materials online. Thus, economic viability hindered most participants from using MOLE. Economic viability constrained participants when deciding whether to pursue using MOLE or not. Likewise, participants were concerned about the security of their students who needed to go to Internet cafés to access their learning resources online. The danger in students going out to get access at an inappropriate time was constraining to most academics.

Fourth dimension:Students' work and validity of control

This constraint referred to the element of trust when students' assessment tasks (e.g. during quizzes) were performed outside the classroom. The major issue on students' work and validity of control was particularly related to scheduled online tests and to assignments required in the course. These were the issues mentioned by the 20 participants. Yet, participants whose courses had no computer laboratory also welcomed the idea of deploying tests online. However, the issue about no computer laboratory arose because they cannot personally supervise their students who had to take the test either in Internet cafés, their residences, or open laboratories. The participants' main issue was the validity and the veracity of their students' answers. They could not simply trust that their students genuinely answered tests by themselves. This issue conformed to the second dimension above.

In the same manner, participants were anxious about online participation of their students in the event that online learning was formally mandated as an alternative delivery of instruction. This was in relation to control mechanisms such as cross-checking who participated in online activities, which one participant said was another challenge when delivering online lessons.

In summary, four dimensions were generated as shown in Figure 1.

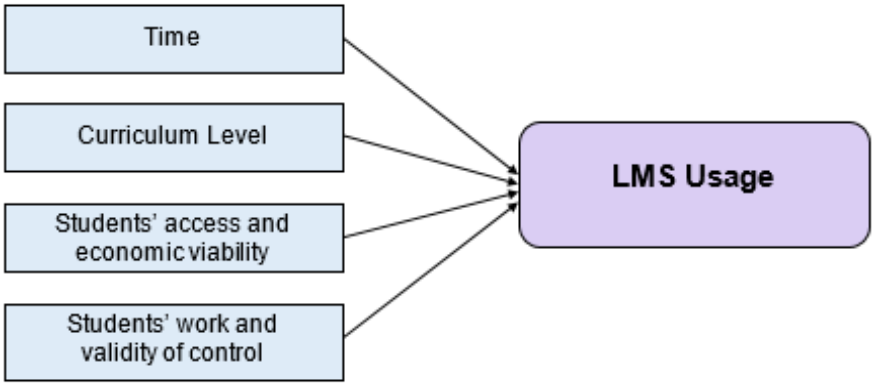

Figure 1. Learning environment constraints

Findings suggested that participants claimed that the four constraints (time management, curriculum level, students' access & economic viability, and students' work & validity of control) had influenced their satisfaction level, which then affected their decision to use MOLE. Some of the participants decided to use other alternatives instead of continuing to use MOLE because of these constraints. A few of the participants were fully aware of the benefits of MOLE, but they were not enthusiastic to use it because they claimed they lacked training and found other systems (e.g. social media such as Facebook, Instagram, or Tweeter) easier to use.

To validate the findings suggested by the results of the qualitative data, the log activities of the participants were analysed and are presented in Table 1.

As shown in Table 1, the left-most column represented the academics (as Acad. Num). Eleven of the academics from the total number of 33 participants were not users of MOLÉ, hence they were not included in this table. Consequently, only the usages of 22 academics were included for MOLÉ log usage analysis.

A more specific group of activities was presented as non-interactive and interactive as shown in the top-most row of Table 1. Under each column heading was a number in parenthesis which indicated the number of academics who used each element or activity, while the numbers shown in each cell indicated the total usage counts.

Non-interactive activities were notions that did not have interchange of ideas among the participants of the learning environment. Activities in the non-interactive group consisted of course, assignment, resource, and survey. The course column showed the logs that were recorded when users logged in and pursued some activities within the learning environment. With the exception of course logs, assignment activity was shown to have the highest transaction count (total = 13, 406), although the resource activity was shown to have the most number of academics (18) utilizing it.

Table 1: MOLE log activities

Acad. Num		Non-interactive				Total Non-interactive	Interactive					Total Interactive	Grand Total
		course	assign-ment	re-source	survey		quiz	forum	blog	chat	journal		
		(22)	(17)	(18)	(2)		(13)	(18)	(6)	(1)	(4)		
#	26	2,970	2,935	335		6240	519	1,799			1,306	3,624	9,864
#	5	4,770	2,939	644		8,353	1,124	25	1			1,150	9,503
#	15	1,008	978	228		2,214	850	893		4	26	1,773	3,987
#	9	1,265	1,874	211	31	3,381		198	2		160	360	3,741
#	13	257	3,365	3		3,625		110				110	3,735
#	28	629				629	1,521	134				1,655	2,284
#	25	643	653	80	3	1,379	38	10	5			53	1,432
#	6	475		411		886	373					373	1,259
#	27	628	219	31		878	329	15	2			346	1,224
#	18	435	59	86		580		629				629	1,209
#	4	324	125	72		521	26	225				251	772
#	33	588	37	70		695	11	15				26	721
#	3	400	9	46		455	114	5			20	139	594
#	19	339	17	106		462		70	3			73	535
#	22	208	43	46		297	144	1				145	442
#	17	357	10	21		388	1					1	389
#	32	150	14	36		200	131					131	331
#	20	123	139	14		276							276
#	2	92				92		122	3			125	217
#	14	185	2			187		2				2	189
#	31	80		28		108		3				3	111
#	23	14				14		10				10	24
Total		15,398	13,406	2,447	34	31,860	5,180	4,264	16	4	1,512	10,979	42,839

An interactive activity occurred when students had to answer, e.g., the quiz that was deployed and activated by the teacher in a specific period. Activities in the interactive group consisted of quiz, forum, blog, chat, and journal activities. Forum was shown as the most often-used activity with 18 academics who used it. Quiz was shown to have the most interactions (total = 5,180), while chat was shown to have the least interactions. Per indication, one academic's record (#28) shows that quiz was utilized the most. Also, chat was not commonly used as shown in the table – with only one academic (#15) recorded to have used it.

Table 2 presented the high and low usage for interactive and non-interactive activities. It should be noted that out of 33 participants only 22 were using MOLE. As shown, only 19 participants with logs (PwL) had an average usage (1.91) and median (0.82) of interactive activities. Conversely, only two participants had an average and median usage (39.42) of high interactive activities which included quiz, chat, and forum. As for the non-interactive users, the table showed that there was a high average (50.79) and low average (4.3) of participants who uploaded modules, lessons, documents, and lecture notes through the MOLE platform. These results confirmed the constraints of the participants in using the MOLE.

Table 2. High and low usage for Interactive and Non-interactive activities

2- Medium	1	9.39	9.39	12.37	12.89
3- High	2	39.42	39.42	50.79	48.3
Legend: PwL - participants with logs; Ave - average; M - Median					

The interaction that occurred between interactive usage and curriculum level constraints and student's access and economic viability were deduced to have influenced. The extent of interactive usage influenced perception of curriculum level constraints. These are shown in Table 3.
A big number of participants had been recorded to have had low interactive usage based on log results because of the effects of curriculum constraints.

Table 3. Interaction matrix for learning environment constraints to usage log entries.
Legend: X - no interaction; Y - with interaction

DIMENSIONS / USAGE LOG ENTRIES	Time management	Curriculum level constraints	Students' access and economic viability	Students' work and validity of control
Interactive usage (22/22)	X	**Y**	**Y**	X
Non-interactive usage (22/22)	X	X	X	X
Without logs (11/33)	X	X	X	X

Curriculum constraints had been identified as issues that relate to course description and requirements. Participants had low usage of interactive features like using interaction and communication tools and feedback and assessment tools. Participants claimed that one of the major issues was the students' accessibility due to economic reasons. What had been said by participants referring to students' access problems were in their low interactive usage. The common tendency of the participants was to decide not to use MOLE because of the large percentage of students who did not own computers.

The study indicated that the program handled by academics influences the perception of curriculum level on the context of undergraduate and graduate courses. On the other hand, both academic position and academic discipline influenced the dimensions of curriculum level, students' access and economic viability, and students' work and validity of control. Among the four dimensions of learning environment constraints, these three were external influences that a participant did not have control of. Whereas, time management was internal to the participant and the use of MOLE was based on his/her own discretion. Coupled with a strong motivation, the participant controlled or managed his/her time to prepare learning resources or practice the use of MOLE. Based on the system logs, the study also showed that low usage of interactive features was strongly influenced by students' economic viability and access. The system logs justified what had been shown in the coded references as influenced also by academic discipline and academic position. The low interactive usage encompassed the use of non-interactive features which indicated that academics decided on using MOLE depending on the situation, such as for submission of assignments or for posting lesson notes, as most academics were not compelled to use MOLE for their classes. Although some of them chose to use MOLE consistently, many of the participants decided to do so if their students were amenable to its use.

Conclusions and Recommendations

Academics' usage of the LMS was influenced by the socio-technological landscape of the learning environment. More importantly, the study verified that academic disciplines had crucial influences to LMS usage. This research found that there were varied approaches for each course, and more specifically, on subject content that can best fit a blended delivery of instructions. Extending further studies in this context will benefit this area of research.

Results of the Bolliger and Wasilik (2009) study suggested that instructors were affected with difficulties on the reliability of technologies and affirmed that they needed to be more creative to teach online. The result of the Bolliger and Wasilik (2009) study was similar to this study in terms of the difficulty or challenges experienced with technology and learning resource preparation. Institution-related issues were found to be important to online faculty. Their results showed that workload, compensation, preparation, and course evaluations affect their satisfaction and motivation which were similar to the findings in this study. Interestingly, the study of Garrote and Pettersson (2007) was similar to the context of time management in this study (e.g., the amount of time to attend training, prepare materials, and interact or manage discussions online). The Garrote and Pettersson (2007) study indicated also that academics equated their time and effort to their salary received.

This study may guide academics and administrators on minimizing constraints in their own environments to possibly enhance system usage. On a larger scope, universities that have similar environmental conditions in terms of institutional policies and economic viability of students may benefit from the findings in this study. Institutional policies are mechanisms that recognize the relevance of LMS usage in organizations (e.g., on the executive management level). Moreover, network and infrastructure, as well as technology support can be facilitated by these mechanisms. This recognition extends to students getting access to reliable network system which redounds to academics' motivation to use the LMS in blended environments.

The qualitative interviews were matter-of-fact accounts of what academics felt about the LMS and their aspirations for having a useful and beneficial tool for teaching and learning with technologies. Analysis of computer logs furthered the understanding of the academics' claims about their usage of the system.

A deeper analysis of log files of usage by academics can be done using a longitudinal study or an action research approach. Analyzing log files can help visualize the interaction patterns of academics with their students. It would be worthy to examine the extent to which students interact and collaborate with each other and with their teacher through the LMS, and the extent to which this has accelerated the quality of teaching and learning. Also, a more rigid study can be made by considering an evaluative research for academics' usage within department or subject area; or in a wider scope, a comparison of usage across subject disciplines in various colleges of the university.

Many of the complaints were in relation to access of their students because of economic reasons. Most students did not have their own computers. If they did have their own computers, most did not have Internet connection at home. Even some academics had the same problem. The problem of student access was a challenge that most academics face. Enforcing the use of MOLE for their courses made it more difficult for others. This constraint is a university–wide problem related to policies which academics cannot solve by themselves.

Overall, participants implied that a reduced teaching load may be necessary to enable them to develop better learning resources and be motivated to use MOLE. The study found that some participants were not motivated to use the system because of time constraints. They claimed that creating modules for blended learning was doable, but the time to develop the learning resources was lacking. Some participants proposed a reduced teaching load so that they could allocate more time to developing the modules.

The prominent issue in the learning environment perspective relates to the subject discipline – descriptive subjects are better delivered online compared to problem-solving or computational subjects. Findings of this research suggested that the cliche 'one-size fits all' cannot be adhered to. This notion of what subject discipline can be appropriately delivered in a blended learning environment has to be solved on the department or college level.

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Open and Distance eLearning Readiness of a State University Graduate Students

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Abstract

This paper explored the readiness of the Graduate Students of Pangasinan State University Open University Systems (PSU OUS) to adapt an open and distance learning environment. It also described the story of the PSU OUS and the Province of Pangasinan in embracing the concept of Openness. The study measured self-direction, learning preferences, study habits, technology skills, and computer equipment capabilities of the respondents in terms of readiness as a graduate student. The respondents were the teachers of the Department of Education and other primary school teachers from distant parts of the world who were currently enrolled in PSU OUS taking up Masters or Doctorate degrees. Qualitative methodology was used in data collection techniques. The results of the study indicated that graduate students had a positive attitude towards ODeL. It was recommended that a virtual learning environment be proposed for the benefit of the teachers, the graduate students, and the institution and for contribution to the development of ODeL in the Philippines. It is evident in the Philippines that students and teachers are ready and competent enough to contribute to the changing environment of education.

Keywords: *Pangasinan, State University, ODeL, readiness.*

Introduction

Recent developments in technology provide an overwhelming growth to distance learning in different countries which contribute to the acceleration of education for all. The changing environment encourages educational institutions to seek additional platforms to continue to provide quality education. Open and distance e-learning (ODeL) is a way of delivering education through the use of technology, such as the interconnected network.

The Pangasinan State University (PSU) established the Open University Systems (OUS) in the latter part of the year 1996. It was launched at the Lingayen Campus in March 1997. The establishment of the OUS was born out of the need to respond to the unique requirements for further professional and technical development of career people, administrators and managers, technicians, and workers who may have limited time or opportunity to attend or perform at a regular class in the university. At the moment, the OUS still administers a hybrid of open learning systems, composed of 50% distance education mode and 50% face-to-face mode. PSU OUS now faces a transition period to embrace technology and adopt the practice of real online education.

In more than 20 years of existence of the PSU OUS, now is the time for it to adopt a platform suitable for building a virtual learning environment. Dr. Melinda dP. Bandalaria, Chancellor of the University of the Philippines Open University (UPOU), stated during the first MoodleMoot in the Philippines that you cannot adopt Openness without adopting Moodle as a learning management system (LMS) platform. UPOU, as pioneers in open and distance education and Massive Open

Online Courses (MOOC) in the Philippines, is following the footsteps of several top universities worldwide. It is, indeed, a giant that assists and provide expertise to the Commission on Higher Education (CHED) and the Technical Education and Skills Development Authority (TESDA) in the performance of its functions pursuant to Section 14 of RA 10650 (Official Gazette of the Republic of the Philippines, 2014). Several studies conducted in the institution aimed to achieve Openness in OUS through efforts such as the use of Google Suite application and social media. However, because of the problems encountered during implementation, the institution has failed to reach total Openness to this date, resulting to the implementation of blended learning instead of the targeted total open online learning and thus this is a timely study to determine the readiness of the PSU OUS.

Objectives of the Study

This study aimed to answer the following questions: (1) What is the profile of the respondents in terms of: age, sex, program, level of educational attainment, licensure examination passed, area of expertise, field of specialization, years of teaching, and rank and grade levels? (2) What is the level of readiness (Williams, 2018) of OUS graduate students for ODeL in terms of self-direction, learning preferences, study habits, technology skills, and computer equipment capabilities? and (3) Is there a significant relationship between the level of readiness in ODeL and learning across the profile of the respondents?

Significance of the Study

ODeL is the future of learning. It can make learning happen faster and more efficiently while still considering the own pacing of the student. It is convenient to both learners and teachers. Considering these advantages of ODeL, it was found that it is essential that the province of Pangasinan be ready to adopt the change in technology. Despite of the reality that the Philippines still has ways to go in terms of technology (i.e., Internet connectivity) (Becker, 2002), the researchers acknowledge that readiness to adapt new technologies and innovations is essential for preparation for integration with ODeL. This study is significant to determine the readiness of the graduate students in the Province of Pangasinan. It is a basis for the implementation of a comprehensive learning management platform and virtual learning environment.

This study may benefit not only OUS as an institution but also other universities in determining if graduate students are ready to adapt ODeL. This study is an eye-opener for the OUS administration and can be a basis for other distance learning institutions in implementing and adopting LMS. Moodle is defined as "a learning platform designed to provide educators, administrators, and learners with a single, robust, secure, and integrated system to create personalized learning environments" (Dougiamas & Taylor, 2003). There are several studies conducted related to LMS, and truly Moodle is the best, if not the only option for LMS. The study of Melton (2006) entitled "The LMS Moodle: A Usability Evaluation" examined the process and different module function on the usability. The platform is considered as the one that fitted the needs for ODeL (Kumar, Gankotiya, & Dutta, 2011) based on the comparative studies.

Online Learning in a Region in the Philippines

Based on the experience of PSU OUS, online learning employs a module-based learning approach. The module is used for self-learning until such time as technology arises. In the year 2012, a Moodle LMS was tested by the Webmaster of the OUS, but due to the lack of manpower, the LMS was not maintained and only tested one Computer Subject. Based on the experience of the tester, Moodle LMS was very useful in addressing the need for online learning. In the year 2016, a new executive director approved the utilization of Google GSuite Applications such as Google Classroom, Hangouts and other application by Google. While the GSuite application has an excellent contribution to the blended learning approach, the functionality is very much limited and cannot accommodate the overall need of the Open University Systems. In the present year, the current web administrator proposes the use of Moodle as an eLearning Platform, and it is pending for the implementation. In the year 2018, based on the benchmarking report from several Open University in the Philippines, the PSU Open University planned to adopt the practice of Openness in education. Thus, the Pangasinan State University includes plans to adopt Moodle as its LMS platform.

Research Methodology

In this research study, the researcher adopted the quantitative method of research. It used the survey as a method of data collection in the form of questionnaires because it yielded information that was more systematic for all participants.

Sources of Data and Processing

The graduate students of PSU OUS for the SY 2017-2018 were the sources of data for this study. The PSU OUS had a total of more than 400 students for the SY 2017-2018. PSU OUS was one component of PSU that offered Masters and Doctorate degrees in Pangasinan. All of students of PSU OUS who were also educators were invited to participate in the survey. Purposive sampling based on characteristics of a population and the objective of the study was used.

Participants were requested to complete the survey within one term from the date of the issuance. The researcher shortened the link using bit.ly and posted it in all the Google Classroom class newsfeed. The survey questionnaire was floated using Google Forms, and extracted in CSVKit for analysis. The gathered data was analyzed using a spreadsheet which automatically created a graphical representation of the result.

Statistical Treatment Used

Frequency and Percentage were used in the first and second problems which were about the profile of the respondents and the readiness of the graduate students and grade teachers. Average weighted mean was also used in determining the interpretation based on the Likert rating scale used.

For the last problem, Pearson correlation was used to measure significance at the 0.05 level (2-tailed). In order to simplify statistical computation, all data was inputted into the software SPSS for faster analysis of data.

Results and Discussion

Results generated by the Google Forms and extracted to CSV format showed that both graduate students and teachers had a positive attitude towards ODeL. It was recommended that a virtual learning environment should be implemented for the benefit of the teachers and graduate students.

Table 1: Profile of the Respondents

Variables	Categories	Frequency	Percentage
1. Age	20-29 Years Old	41	40.6
	30-39 Years Old	39	38.6
	40-49 Years Old	15	14.9
	50-59 Years Old	6	5.9
	Total	101	100.0
2. Sex	Male	33	32.7
	Female	68	67.3
	Total	**101**	**100.0**
3. Program Course	Master of Arts in Education	85	84.2
	Master in Development Management	7	6.9
	Doctor of Education	3	3.0
	Specialization Courses	6	5.9
	Total	**101**	**100.0**
4. Level of Education	Bachelor's Degree	40	39.6
	Master Level (with Units)	49	48.5
	Master's Degree	10	9.9
	Doctorate Level (with Units)	2	2.0
	Total	**101**	**100.0**
5. Licensure Examination Passed	Licensure Examination for Teachers	67	66.3
	National Certificates	3	3.0
	Professional Civil Service	5	5.0
	Others	5	5.0
	None	21	20.8
	Total	**101**	**100.0**

As shown in the table, the profile of the respondents revealed that majority were 20 years of age at 41% followed by 30 years of age at 38.6%, this showed that majority of the respondents belonged to the millennial group. Majority of the respondents were female which showed that most of the students in OUS are female. Masters of Arts in Education (MAEd) consisted the most numbers of respondents at 84.2%; this also validated that MAEd had the most number in the population of students and most of them had Bachelor's Degrees and were currently at Master Level. Lastly, the majority of the respondents passed the licensure examination for teachers.

Table 2: Profile of the Respondents

Variables	Categories	Frequency	Percentage
6. Field of Specialization	Computer Science	4	4.0
	English and Filipino	19	18.8
	General Education	31	30.7
	Mathematics	8	7.9
	SCIENCE	5	5.0
	Social Studies	6	5.9
	TLE	7	6.9
	Others	16	15.8
	None	5	5.0
	Total	101	100.0
7. Rank	Teacher 1-3	63	62.4
	Head Teacher 5	1	1.0
	Master Teacher 2	2	2.0
	School Administrator	6	5.9
	Private Teacher	7	6.9
	Administrative Aide III	4	4.0
	Others	9	8.9
	None	9	8.9
	Total	101	100.0
8. Years of Teaching	No Teaching Experience	19	18.8
	1-10 Years	67	66.3
	11-20 Years	11	10.9
	21-30 Years	4	4.0
	Total	101	100.0

9. Grade Level of Teaching	Kindergarten	7	6.9
	Grade 1-3	27	26.7
	Grade 4-6	17	16.8
	Grade 7-9	17	16.8
	Grade 10-12	13	12.9
	Others	7	6.9
	None	13	12.9
	Total	101	100.0

As shown in the table, the majority of the graduate students specialized in General Education. This showed that most of the respondents were teaching in primary schools. Also, the majority of the respondents were holding the position of Teacher 1 to 3 and had been teaching around 1 to 10 years. Lastly, most of the respondents taught in elementary level such as Grade 1 to 3.

Table 3: Readiness of the Graduate Students

A. Self Direction	1	2	3	4	5
1. I am good at setting goals and deadlines for myself.	0	0	17	51	33
	0.0%	0.0%	16.8%	50.5%	32.7%
2. I have a really good reason for taking an online course.	0	1	14	44	42
	0.0%	1.0%	13.9%	43.6%	41.6%
3. I finish the projects I start.	0	1	11	53	36
	0.0%	1.0%	10.9%	52.5%	35.6%
4. I do not quit just because things get difficult.	0	3	7	35	55
	0.0%	3.0%	6.9%	34.7%	54.5%
5. I can keep myself on track and on time.	0	3	15	56	27
	0.0%	3.0%	14.9%	55.4%	26.7%
Weighted Mean: 4.21 (Agree)					
B. Learning Preferences					
6. I learn fairly easily.	0	2	18	64	17
	0.0%	2.0%	17.8%	63.4%	16.8%
7. I can learn from things I hear, like lectures, audio recordings, or podcasts.	0	1	14	54	32
	0.0%	1.0%	13.9%	53.5%	31.7%

8. I have to read something to learn it best.	0	3	7	48	43
	0.0%	3.0%	6.9%	47.5%	42.6%
9. I have developed good ways to solve problems I run into.	1	2	12	51	35
	1.0%	2.0%	11.9%	50.5%	34.7%
10. I learn best when I figure things out for myself.	0	4	12	47	38
	0.0%	4.0%	11.9%	46.5%	37.6%
11. I like to learn in a group, but I can learn on my own as well.	0	2	12	51	36
	0.0%	2.0%	11.9%	50.5%	35.6%
12. I am willing to send e-mail to or have discussions with people I might never see.	1	2	28	39	31
	1.0%	2.0%	27.7%	38.6%	30.7%
Weighted Mean: 4.13 (Agree)					
C. Study Habits					
13. I usually study in a place where I can read and work on assignments without distractions.	0	1	20	31	49
	0.0%	1.0%	19.8%	30.7%	48.5%
14. I can ignore distractions around me when I study.	4	13	30	41	13
	4.0%	12.9%	29.7%	40.6%	12.9%
15. I am willing to spend 10-20 hours each week on an online course.	1	7	42	29	22
	1.0%	6.9%	41.6%	28.7%	21.8%
16. I keep a record of what my assignments are and when they are due.	0	2	19	44	36
	0.0%	2.0%	18.8%	43.6%	35.6%
17. I plan my work in advance so that I can turn in my assignments on time.	0	4	19	54	24
	0.0%	4.0%	18.8%	53.5%	23.8%
18. When I study, people around me will help me work and not try to distract me.	2	6	24	51	18
	2.0%	5.9%	23.8%	50.5%	17.8%
19. I am willing to use e-mail and other online tools to ask my classmates and instructors questions.	0	1	9	52	39
	0.0%	1.0%	8.9%	51.5%	38.6%
Weighted Mean: 3.93 (Agree)					
D. Technology Skills					
20. I am fairly good at using the computer.		1	12	53	35
	0.0%	1.0%	11.9%	52.5%	34.7%
21. I am comfortable surfing the Internet.	0	1	14	31	55
	0.0%	1.0%	13.9%	30.7%	54.5%

22. I am comfortable conducting searches, setting bookmarks, and downloading files.		1	15	46	39
	0.0%	1.0%	14.9%	45.5%	38.6%
23. I am comfortable installing software and changing configuration settings on my computer.	1	4	33	40	23
	1.0%	4.0%	32.7%	39.6%	22.8%
24. I know someone who can help me if I have computer problems.	1	4	13	38	45
	1.0%	4.0%	12.9%	37.6%	44.6%
Weighted Mean: 4.16 (Agree)					
E. Computer Equipment Capabilities					
25. My computer and Mobile devices runs reliably on Updated Operating Systems.	1	4	17	47	32
	1.0%	4.0%	16.8%	46.5%	31.7%
26. I have a printer.	5	14	12	24	46
	5.0%	13.9%	11.9%	23.8%	45.5%
27. I am connected to the Internet with a fairly fast, reliable connection.	1	8	21	39	32
	1.0%	7.9%	20.8%	38.6%	31.7%
28. I have virus protection software running on my computer.	2	5	19	38	37
	2.0%	5.0%	18.8%	37.6%	36.6%
29. I have headphones or speakers and a microphone to use if a class has a videoconference.	2	4	22	36	37
	2.0%	4.0%	21.8%	35.6%	36.6%
30. My browser will play several common multimedia (video and audio) formats.	1	2	20	45	33
	1.0%	2.0%	19.8%	44.6%	32.7%
Weighted Mean: 3.99 (Agree)					
Overall Weighted Mean: 4.07 (Agree)					
Legend: 1- Strongly Disagree; 2-Disagree; 3-Neutral; 4-Agree; 5-Strongly Agree					

The respondents which were graduate students had a positive response in the readiness for online distance education. Under Self Direction, the respondents Agreed with a weighted mean of 4.21 which meant that they were ready for ODeL. It showed that the respondents were self-directed, such that they were setting a deadline for themselves and finishing projects that they started. Under Learning preferences, graduate students Agreed that they were ready in this aspect with a weighted mean of 4.13. While Study Habits showed the lowest weighted mean with 3.93 which still denoted that they Agreed. Under the Technological Skills, the graduate students Agreed that they were ready in terms of having skills in utilizing technology. Lastly, under Computer Equipment Capabilities, respondents showed that they had equipment for learning.

Table 5: Relationship between the Readiness of the Graduate Students and their Profile

Variables	Correlation	Readiness of the Graduate Students				
		Self-Direction	Learning Preferences	Study Habits	Technology Skills	Computer Equipment Capabilities
Age	r-value	.172	.114	.139	-.169	.172
	p-value	.085	.257	.165	.092	.086
Sex	r-value	.020	.014	.094	-.015	-.142
	p-value	.842	.889	.350	.884	.157
Program Course	r-value	.118	.128	.144	.160	.069
	p-value	.239	.203	.150	.110	.491
Level of Education	r-value	.244*	.157	.215*	.149	.166
	p-value	.014	.117	.031	.137	.098
Licensure Examination Passed	r-value	.166	.129	.248*	.059	.075
	p-value	.097	.199	.012	.557	.455
Field of Specialization	r-value	.095	.061	.053	.098	.009
	p-value	.345	.544	.601	.328	.927
Rank	r-value	.008	.015	.031	.067	-.070
	p-value	.939	.879	.757	.505	.487
Years of Teaching	r-value	.100	.011	.014	.041	.229*
	p-value	.321	.915	.888	.680	.021
Grade Level of Teaching	r-value	.055	.049	.012	.065	-.020
	p-value	.586	.625	.908	.521	.844
*. Correlation is significant at the 0.05 level (2-tailed).						

Based on the result, Study Habits showed that study habits are the lowest among them all. This contradicted the study of Coopasami, Knight, and Pete (2017) where it was found that students' psychological readiness for e-Learning was high, but they lacked technological readiness. The study was conducted on nursing undergraduate students and these technical aspects were more comfortable to resolve than improving psychological readiness. It was suggested to compare undergraduate and graduate students readiness in eLearning.

The Philippines had just started to embrace technology in the implementation of online education. Even prominent universities proposed researches in order to help public schools embrace online education (Nuncio, et. al., 2015) for policy formulations toward inclusive education. In addition, top universities discussed issues in the implementation of online education (Arinto, 2016). Some state universities in the Philippines had been adopting free platform as a start in distance learning,

but contained limitations, unlike Moodle. It was advised that teachers should enroll in online learning courses such as MOOCs in order to be familiarized with online learning, as discussed in the study of White, Leon, Borthwick & White (2015). Also, the platform and course were designed to promote social learning at scale. It was found that teachers needed to have apt experience in online learning since they are a contributing factor for the future of learning in the Philippines.

The data in Table 5 reveal that there was a slight relationship ($r= 0.244$, $p = 0.014 < 0.05$) between the profile of the respondents in terms of level of education and their readiness in open and distance education in terms of self-direction. This implied that the level of education of the respondents affected their readiness for open and distance education in terms of self-direction.

The data also revealed that there was a slight relationship ($r = 0.215$, $p = 0.031 < 0.05$) between the profile of the respondents in terms of level of education and their readiness in terms of study habits. This meant that the readiness of the respondents in open and distance education in terms of study habits was affected by their level of education.

Likewise, the data also revealed that there was a slight relationship ($r = 0.248$, $p = 0.012 < 0.05$) between the profile of the respondents in terms of licensure examination passed and their readiness in terms of study habits. This meant that the readiness of the respondents in open and distance education in terms of study habits was affected by the licensure examination they passed.

It was also revealed that there was a slight relationship ($r = 0.229$, $p = 0.021 < 0.05$) between the profile of the respondents in terms of their years of teaching and their readiness in terms of computer equipment capabilities. This meant that the years of teaching experience of the respondents was a determinant of their readiness in open and distance education in terms of computer equipment capabilities.

Hence, after testing the null hypothesis at 0.05 level, there was enough evidence to reject it. There was a significant relationship between the readiness of the respondents in open and distance education and their profile.

Conclusions and Recommendations

This study concluded that the majority of the respondents were ready for ODeL. The attitude of the graduate students in ODeL was positive. Regarding the correlation of profile and readiness of student, there was a significant relationship between the level of education of the respondents with their self-direction and study habits, between the licensure examination passed and their study habits, and between years of teaching and their computer equipment capabilities. While teachers as students especially millennials had a more positive outlook on online education, experienced teachers were also willing to adapt to the changing environment in education. Thus, graduate students or grade school teachers were found to be ready for online learning. It was recommended that the Department of Education focus on long-term implementation to support the growing need for distance learning and technological adaptation. Also, state universities and colleges in the Philippines should help DepEd schools through extension project to help the schools promote online learning, specifically the use of technology in online learning. The results

of the study indicated that graduate students had a positive attitude in ODeL. It was recommended that a virtual learning environment should be proposed for the benefit of the teachers, graduate students, the institution, and for contribution to the development of ODeL in the Philippines. Thus, future studies with broader scope such as gamification in education and other related studies on readiness was recommended to be conducted to validate future results.

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We call on colleagues, such as academics, researchers, technology developers, and open distance e-learning experts to submit their articles for publication in the International Journal on Open and Distance e-Learning. The IJODeL is a semestral journal, hence it comes out every June and December of the year.

The preferred articles are those reporting original research, articles based on critical analyses of e-learning undertakings, book reviews, evaluation studies, and original think pieces such as concept papers.

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For both the articles and proposed articles, follow the templates for articles.

Title of Article

Author 1[1]and Author 2[2]

[1]Position, Institutional Affiliation, Country, Email address

Abstract

Abstract in 150-250 words.

Keywords: No more than five (5) keywords.

Introduction (Center Heading 1)

This section contains a clear historical background of the study, showing why the research had to be undertaken. In this section, the author(s) shall have the opportunity to expound on what the research says about the research problem, and show clear support for the need to undertake the research, through appropriate research gap analysis.

Objectives (Center Heading 2)

This section provides a clear statement of the goals and objectives of the research.

Conceptual/Theoretical Framework (Center Heading 3)

The conceptual or theoretical framework would be expected for research studies that dealt with empirical procedures and methodologies. A framework of this nature would provide for clear interrelationships and direction of interactions of variables which the researcher expects to show by his/her data and data interpretations. It should be noted that variable interactions may be easier to understand if they were to be presented in illustrated model formats.

Methodology (Center Heading 4)

This section includes brief discussions of data collection procedures and analyses. Data must be presented in appropriate tables.

Results and Discussions (Center Heading 5)

Analytical discussions must present possible relationships of the results of the study and the findings from other studies specifically reviewed for this purpose. Post analysis data may be presented in both statistical tables and appropriate models and figures.

Include subheadings as are necessary.

Conclusions and Recommendations (Center Heading 6)

Conclusions must be according to the objectives of the study.

Recommendations must reflect the objectives and conclusions of the study.

References

General format must follow the suggestions for authors, but generally must follow the APA Style for publications.

Template for Qualitatively-Oriented Articles

Title of Article

Author 1[1] and Author 2[2]

[1]Position, Institutional Affiliation, Country, Email address

Abstract

Abstract in 150-250 words.

Keywords: no more than five (5) keywords

Introduction (Center Heading 1)

This section contains the historical background of the study, including specific reports and studies that provided direct support to the research problem. Some relevant part of the literature shall be included in the discussion of the research problem to establish more strongly the need to undertake the study.

Objectives of the Study (Center Heading 2)

This section contains both the research over-all goal and the specific objectives to be attained.

Relevant Studies or Review of Related Studies (Center Heading 3)

Review of studies that are highly related to the current study. After the relevant studies have been presented, a synthesis of these may be presented and the relationship of such synthesis must be related to the study under consideration.

Subheading may be determined as necessary. In these subheadings, specific observations may be noted and statistical tables presented as well as figures and models.

Discussions (Center Heading 4)

In this section shall be inserted full discussion of results and finding, discussed more deeply in relation to the related studies already reviewed. Subheads may be determined and included in the discussions.

Conclusions (Center Heading 5)

The conclusions of the study must reflect the objectives of the research.

Recommendations (Center Heading 6)

All recommendations must appropriately correspond to the conclusions, and therefore the objectives of the study.

References (Center Heading 7)

Follow the APA Style Guide.

Style Guide for Full Paper Submission

The paper should be 15-25 pages long (including tables, figures, and references) and prepared preferably in Microsoft Word format. The author(s) should provide a title, the name(s) of the author(s), position(s), institutional affiliation(s), institutional address(es), email address(es) and key words (no more than five). You may make use of the template for preparing your paper: Journal Article Template (Qualitatively-Oriented); Journal Article Template (Quantitatively-Oriented). Detailed guidelines are as follows:

1. **Font type**
   The whole text should be in Arial.

2. **Margins**
   The paper should be A4 size (21 x 29.7 cm). All margins (top, bottom, left, and right) should be 1 inch.

3. **Line Spacing**
   The whole text should be single-spaced.

4. **Title**
   The title of the paper should be 14-point, bold, in capital and lower case letters, and centered.

5. **Author Information**
   Use 12-point and centered for the author name(s). The Western naming convention, with given names preceding surnames, should be used.

   The author name(s) should appear below the title, with one blank line after the title.

   Use 10-point for author(s)' position(s), institutional affiliation(s), country, and email address(es).

   The author(s)' position(s), institutional affiliation(s), institutional address(es), and email address(es) should appear below the author name(s), with one blank line after the name(s).

6. **Headings**
   - Heading font (with the exception of the paper title and the abstract) should be 14-point Arial and in bold.
   - Headings should be centered and in capital and lower case letters [i.e. nouns, verbs, and all other words (except articles, prepositions, and conjunctions) should be set with an initial capital].
   - There should be two blank lines before each heading and one blank line after it.

7. **Subthemes**
   - Subtheme(s) should be 14-point Arial, in bold capital and lower case letters, and flushed left.
   - There should be one blank line before and after each subtheme.

8. **Abstract**
   - The abstract heading should be 14-point Arial, bold, centered.
   - The abstract should be in 150-250 words.
   - The main text of the abstract should be 12-point Arial, italicized.
   - Alignment of the main text of the abstract should be justified, no indent.

9. **Key Words**
   - Include at most five keywords.
   - Use 12-point Arial. The keywords should appear below the abstract, with one blank line after the abstract.

10. **Main Text**
   - In general, paragraphs should be separated by a single space.
   - All paragraphs must be in block format.
   - Text font should be 14-point Arial, single-spacing. Italic type may be used to emphasize words in running text. Bold type and underlining should be avoided.
   - The first line of each paragraph should not be indented.

11. **Tables and Figures**
   - Tables and figures should be numbered and have captions which appear above them.
   - Graphics and pictures should not exceed the given page margins.
   - Captions should be 14-point centered.
   - The tables and figures of the paper should follow the APA citation style.
   - There should be no space between the caption and the table/figure.

12. **Footnotes**
   - Footnotes may be used only sparingly. A superscript numeral to refer to a footnote should be used in the text either directly after the word to be discussed or – in relation to a phrase or a sentence – following the punctuation mark (comma, semicolon, or period)
   - Footnotes should appear at the bottom of the page within the normal text area, with a line about 5 cm long immediately above them.
   - Footnotes should be 10-point and aligned left.

13. **References**
   - The author-date method in-text citation should be used. Following the APA format, the author's last name and the year of publication for the source should appear in the text.

   - All references that are cited in the text must be given in the reference list. The references must be in APA format and arranged alphabetically at the end of the paper.

Sample:

Surname, A. A. (year). Article title. *Title of Journal, volume number*(issue number), inclusive page numbers.

Surname, A. A. (year). *Title of book.* Publisher location: Publisher Name.

Surname, A. A., Surname, B. B., & Surname, C. C. (2000). Title of article. *Title of periodical, volume number*(issue number). Retrieved from URL/web address.

Surname, A.A. (Year, Month). *Title of paper.* Paper presented at name of conference, city, country.

14. **Length**

The paper should be 3,000-7,000 words including tables, figures, and references.

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The International Journal on Open and Distance e-Learning (IJODeL) welcomes original research articles, book reviews, theories, and best practices pertaining to ODeL worldwide. Articles should be 3,000-7,000 words including tables, figures, and references.

A publishable quantitatively-oriented paper should contain the following:

1. Abstract
2. Objectives
3. Conceptual/Theoretical Framework
4. Methodology
5. Results and Discussions
6. Conclusions and Recommendations
7. References

Go to: Quantitatively-Oriented Journal Article Template

A publishable qualitatively-oriented paper should contain the following:

1. Abstract
2. Objectives of the Study
3. Relevant Studies or Review of Related Studies
4. Discussions
5. Conclusions
6. Recommendations
7. References

Go to: Qualitatively-Oriented Journal Article Template

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