An Evaluation of the Success of Moodle at the University of Belize

Dean Westby
University of Belize
Del Oro Site, Pomona
2019150783@ub.edu.bz

Devonie Young
University of Belize
308 Los Lagos, Ladyville
200115747@ub.edu.bz

Dwayne Willacey
University of Belize
668 Vernon St. Belize City
200127316@ub.edu

Shenira Quijano
University of Belize
Venezuela Site, Corozal
2020151813@ub.edu.bz

Milvian Veliz
University of Belize
Pomona village, Stann Creek
2018118572@ub.edu.bz

Abstract

We always knew that technology had its many benefits; decreasing costs, improving efficiency, improving performance and making life generally more flexible. In the wake of a global pandemic, we have come to see just how important technology and learning management systems really are. Moodle was not fully being utilized before the pandemic and so urgent changes were implemented to meet university needs. Our research group decided to approach this research from the perspective of a comprehensive evaluation from both perspectives of lecturer and student, in hopes of closing the gap on the weaknesses of the system as well of those of the university in wake of the global pandemic that has forced the university to fully migrate online far sooner than it originally planned. Our review on MOODLE adopts the Good hue and Thompson (1995) Information Success (IS) model to evaluate the success at the University of Belize. The eight dimensions we address in this paper includes: quality, locatability, authorization, compatibility, ease of use, production timeliness, systems reliability, and relationship with users (Goodhue and Thompson, 1995). Data collected from questionnaires submitted to both parties were analysed and the findings of our research provide several implications and recommendations for the University of Belize for MOODLE and it's continued use as the main LMS for the university. Our hypothesis was supported by the data collected and our discussion includes the limitations faced as well as recommendations for the university if they are to go fully digital in the near future. We have concluded that MOODLE is sufficient for the needs of the university as it relates to its short-term objectives but the student body remains with mixed impressions of MOODLE in terms of affordability, accessibility and satisfaction. This paper serves as a contribution of a more in depth look at this LMS and what it can offer to the university's management and student body going fully digital in the very near future.

Keywords: Learning Management System, MOODLE, management system, information systems.

Introduction

The University of Belize is one of the highest tertiary level institutions in Belize. Its name is synonymous with accomplishment in the field of education and is one of the most trusted and affordable establishments in Belize. It provides access to education countrywide through its various campuses and locations. Furthermore, it is recognized and supported by the government of Belize as one of the best providers of quality education.

Educational needs are very complex and society's productive needs change from time to time to meet demand, sometimes in short periods of time or after a drastic change. One such drastic change is the still ongoing pandemic which affected class attendance and access to lessons. Therefore, it was imperative that a system be put in place and that if one already existed, that it be upgraded to ensure the University remains one of leading choices in education. This means that a learning management system implementation would be inevitable as the next step in maintaining customer or student expectations. If the University is unable to meet its students' needs, then it is no longer viable and will certainly fail. To avoid failure, especially in the wake of a global pandemic, the University of Belize had to upgrade the newly implemented MOODLE software to meet students' needs.

MOODLE (Modular Object-Oriented Dynamic Learning Environment) is a learning management system designed for educational institutions which allows it to migrate their lessons and gradings to an electronic platform from anywhere in the world thus freeing the University from burdensome overhead costs, limited lecturers and lesson slots as well as providing more options for students to attend the classes they desire, when they desire to do so. The use of MOODLE has allowed the university to really maximize its resources while still meeting students' needs affordably.

For the purpose of our research, MOODLE's usefulness and success will be thoroughly evaluated. It is important because it is fairly new to Belizean institutions trying to migrate to an online platform and is quite costly to implement and maintain. The university would benefit from knowing if it was a worthwhile investment and if the learning management software will allow them to accomplish their objectives.

Users of the system are key stakeholders in determining how successful the learning management software will be and so, it is imperative that they be properly trained in how to use it as well as how to problem solve should an issue arise. In this regard, our research is also important because it will highlight any gaps that need to be addressed between university objectives and student objectives.
Similar researches were conducted in the past about MOODLE and its impact on Belizean schools however those researches were conducted before the 2019 pandemic, a drastic change which presented issues or limitations in and of itself. Additionally, weaknesses in both the university and MOODLE not previously considered can now be addressed. Our research is original from the perspective of feasibility, speed and flexibility of adapting as a nation in its infancy stage of going digital compared to other institutions in Belize.

Users' feedback is critical in properly evaluating the effectiveness of a learning management system and as such, will determine if it can adequately meet users' needs. We know that many schools in Belize have adopted Moodle however, we don't know how many have been actively using the program and to what extent. We also do not know how effective it has been for them in their quests. We know that UB has been using it for some time and has had to upgrade the service to meet its needs. We do not know exactly how successful UB has been since the last upgrade was implemented and due to the high influx of students now using the system compared to previous years.

Our objective in this research is to evaluate the effectiveness of MOODLE to the University of Belize, evaluate its weak areas as well as the areas the university needs to address in order to maximize the efficacy of the program and their new online approach. Our goal is to interview both lecturers and students to gauge their opinions and experiences using the service. We also plan to confirm if MOODLE is the only LMS needed by the university of Belize.

Literature Review

The Goodhue and Thompson (1995) Task-Technology Fit Model served as the theoretical framework that guided this study. Users may use information systems to help them execute tasks more effectively and efficiently. Organizations invest millions of dollars in information systems in order to increase their overall or individual performance (Goodhue, 1995). Understanding the relationship between information systems and human performance has been a major focus of information systems research. Understanding the effect of technology on individual performance requires a crucial but often ignored construct: task-technology fit. Task-technology fit (TTF) is described by Goodhue and Thompson (1995) as the degree to which a technology aids an individual in performing his or her tasks. More precisely, it is the fit among task requirements, individual capabilities, and the functionality and interface of the technology (Goodhue, 1997). According to Goodhue & Thompson (1995) technology refers to computer systems (hardware, software, and data) as well as user support services in the sense of information systems (such as training and help lines). Individuals use technologies as tools to help them complete their assignments. Individuals' behaviours in converting inputs into outputs are referred to as tasks (Goodhue & Thompson, 1995).
In order for an information system to have a significant effect on individual performance, it must be used, and the activities it supports must be well-suited to the technology (Goodhue & Thompson, 1995). If either the task-technology fit of the technology or its utilization is lacking, the technology will not improve performance. Task-Technology Fit Models consists of two major models connecting technology to performance. The first is the utilization model. Utilization models are based on theories of user attitudes, beliefs, and behaviours. This model implies that increased utilization would have a positive effect on efficiency. The task-technology fit (TTF) model is the second. According to the TTF model, when a technology offers functionality and resources that are tailored to the task's needs, performance will improve (Goodhue & Thompson, 1995). Goodhue and Thompson (1995) developed a measure of task-technology fit that consists of eight factors: quality, locatability, authorization, compatibility, ease of use/training, production timeliness, systems reliability, and relationship with users. Each factor is measured using between two and ten questions with responses on a seven-point scale ranging from strongly disagree to strongly agree.

The Task-Technology Fit Model (Goodhue, 1995) asserted that information technology should be a good fit with the tasks it supports, in order to be utilized and to positively affect user's performance (Goodhue & Thompson, 1995). The model highlights the importance of the fit between information system features and users' tasks and needs, leading to performance impacts. Task-Technology Fit and performance impact are two important constructs which were missing or implicit in other IS adoption models. The Task-Technology Fit Model provides insight on how technology, user tasks, and utilization impact user performance (Goodhue & Thompson, 1995). The TTF suggests that both, task characteristics and technology characteristics, affect user perception of Task Technology Fit, which in return influences the system's utilization and impacts the user's performance.

According to Al-Bahsha and Daoud (2016) a study that was conducted on the students from German Jordanian University, the university uses several information systems. One of the most widely used ICT-based educational tools is the modular object-oriented dynamic learning environment (Moodle, 2020). El-Bahsha & Daoud (2016) pointed out that Moodle is a free, open-source Learning Management System (LMS) that includes a wide range of educational features such as interaction, feedback, discussion and networking. Learning Management Systems (LMS) have seen an increase in adoption as a supplement to face-to-face learning in recent years (Coates, James & Baldwin, 2005).
Moodle includes innovative teaching and learning approaches that have been introduced and used in a number of higher education institutions around the world. The formation, organization, announcement, communication, collaboration, and evaluation of learning and educational activities are examples of these methods as expressed by Bahsha & Daoud (2016). Learning Management Systems, according to Heo & Han 2002, are a framework of instructional resources that organize academic information, determine users' objectives, collect data, and create progressive reports for management supervision. Despite the fact that some universities are using these E-learning platforms as a method for successful learning, further studies should be conducted to determine their overall efficacy.
According to Sampurno, Maulidiyah & Puspitaningrum (2015), Moodle functions as an effective tool in providing learning facilities because it is equipped with important learning support features such as

assignments, quizzes, chat, collaboration, and main features that can upload various formats of learning material and are easier to understand because the information presented is not only in the form of writing but also images. Moodle, a learning management system (LMS) is currently being used by the University of Belize and designed to facilitate the learning process by making the academic life of students more accessible, student friendly and interactive with respect to information quality, system quality, service quality, quality of all complementary assets, the user satisfaction, use, complementary technology quality, computer self-efficacy and perceived net benefits of the system, as these factors together, all play a crucial role in the success of Moodle or any information system for that matter (Bhuasiri et al., 2012). This research was carried out in order to review the effectiveness and success of University of Belize's information system Moodle. Several studies revealed the benefits of using e-learning platforms. Babo & Azevedo (2009) conducted a study of higher education institutes from different countries found that out of 51 institutes that use higher education, 14 use multiple learning management systems. Some studies identify Moodle as the easiest and most-widely used platform in higher education (Colace, De Santo & Vento, M. (2003).

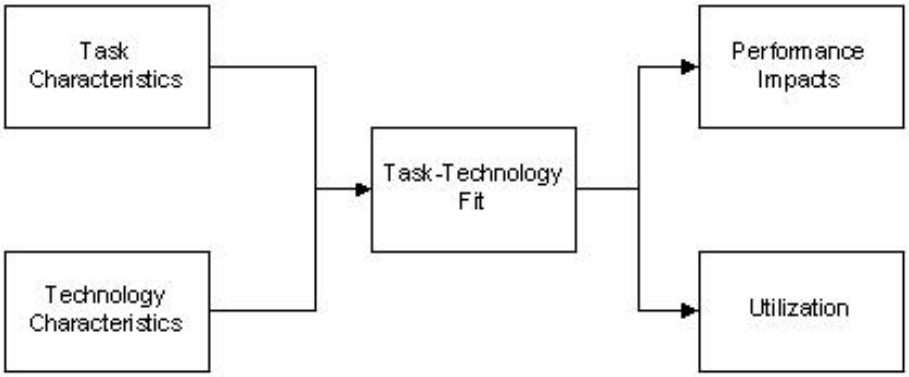
Seddon and Kiew (1994) conducted a study on 104 users and a relationship was identified between "system quality", "user satisfaction" and "individual impact." In addition, a relationship was found between "user satisfaction" and individual impact." A study was conducted by Rai, Lang & Welker (2002) 274 users of a university were surveyed for a "goodness-of-fit test" and some of the goodness-of-fit indicators were Significant. Overall, from the several studies reviewed, the results strongly support the interrelationship and interdependence among the different constructs of the Information System Success Model. Other studies proposed that Moodle is the second most-widely used LMS after Blackboard according to Babo & Azevedo (2009).

According to Saadi, Maine, Berg, and Buderer (2007) there is a discrepancy between developing countries and developed countries in terms of resource availability and developing countries' inability to combine computer systems technology and fast internet speeds to allow optimum usage. Belize is classified as a developing country. Users of Moodle at the University of Belize face slow internet speeds and a lack of sufficient hardware or software, all of which can hinder the learning management system's performance. For this analysis, the researchers tweaked the traditional model. Following these factors, it was decided that Belize clearly lacks the complementary assets required for true IS success (Delone & McLean, 2003). Furthermore, a systematic approach to the application of Information and Communication Technologies (ICT) is missing, as expressed by Saadi et al (2007). People in developing countries lack the necessary skills to operate a simple ICT model (Sife, Lwoga, and Sanga) (2007).

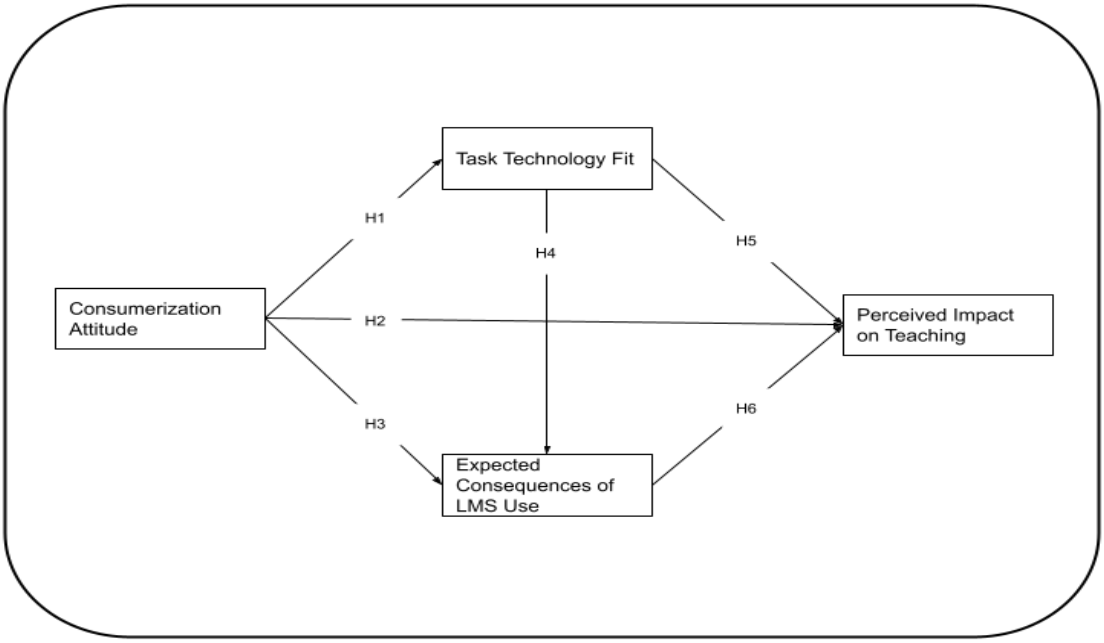
Methodology

We used the Task-Technology Fit Research Model (Goodhue and Thompson 1995) to evaluate constructs of our survey. We did two surveys: one for lecturers and one for students. Each of the eight factors was measured using between two and ten questions with responses on a seven-point scale ranging from strongly disagree to strongly agree.

Fig. 1. Task-Technology Fit adopted from Goodhue and Thompson ,1995



Reconstructed based on Goodhue and Thompson (1995) Research Model



H1 Task Characteristics will positively impact Task-Technology Fit.
H2 Technology Characteristics will positively impact Task-Technology Fit.
H3 Task-Technology Fit will positively impact Performance Impacts.
H4 Task-Technology Fit will positively impact Utilization.
H5 Task–technology fit will have a negative influence on expected consequences of organizational LMS use
H6 Expected Consequences of LMS use positively impacts Perceived Impact on Teaching

The aims of this study were to evaluate how individuals personally feel about MOODLE is effective for online classes. Also, to determine how online classes impacted students and lecturers' experiences regarding class sessions and assignments, if students were actually actively learning. Lastly, if lecturers felt like they impacted students, if and what types of challenges arose while attending online. We decided to conduct a survey to determine if exclusive online classes were a feasible option for the university and if it was worthwhile to students and so we sampled 40 students and 53 lecturers from the University of Belize, who were using MOODLE to facilitate their tasks. This quantitative approach is best for our study because:

- It can be measured accurately.
- It is considered to be objective.
- It uses hypotheses.
- It is structured.
- Sample population can be large for accuracy.
- It is time efficient during the COVID pandemic.
- It is cost effective.
- It is easy to collect data.

The sample size was determined using a statistical reference of 99 percent confidence level and 8% margin of error). This research was carried in the 2021 school year. Students and lecturers from four distinct faculties of studies were chosen to provide the most unbiased results possible.

Participants were mainly contacted using different social media apps such as WhatsApp. They were voluntarily asked to participate in this survey by clicking the google form link that was created for this survey. On average, the completion of the survey took approximately 5 minutes and all answers were anonymous. We followed research ethics principles by:

1. Protecting participants from harm.
2. Protecting participants from deception.
3. Allowing participants the right to withdraw.
4. Providing an Informed Consent to participants.
5. Maintaining participants' privacy.

Our methodology slightly differs from previous research methodologies because we were able to ask questions regarding impact since the pandemic and their perspective on usage given the circumstances. Our assumptions were that all students and lecturers are familiar with the LMS MOODLE and are current and active users.

Data Analysis and Discussion

Student's Results

1. A total of 40 University of Belize students (42.5% males, 50% females and 7.5% who preferred not to state) participated in this research.

2. Majority of the students who participated in this study were between the ages of 16-20 (52.5%), followed by 21-30 (30%), 26-30 (7.5%) and lastly 31-35 & >35 (both 5%).

3. Majority of the students used both Moodle and Google classroom before as their primary LMS.

4. Majority (77.5%) of the participants had obtained an Associate's Degree already, followed by the second largest group (15%) of participants who had already obtained a Bachelor's Degree. Two students had only a high school diploma (5%). Lastly, one student (2.5%) had obtained a Master's degree already.

5. Majority (56.4%) of the participants were from the Faculty of Management & Social Sciences, followed by the Faculty of Science and Technology (25.6%), the Faculty of Education & Arts (12.8%) and the minority being in the Faculty of Health Science (5.1%).

6. Majority (76.9%) of students who participated in this study preferred learning face to face rather than online.

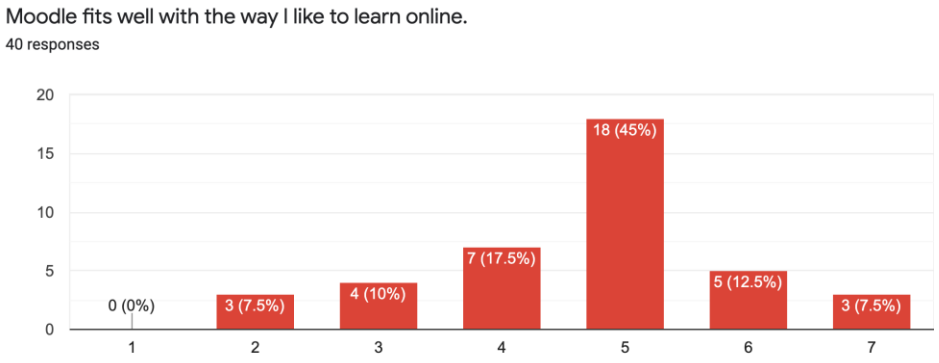
7. Majority (85%) of students who participated in this study believed that they were more effective learning face to face rather than online.

8. Majority (87.5%) of students who participated in this study believed that students learn more in face-to-face classes rather than online classes.

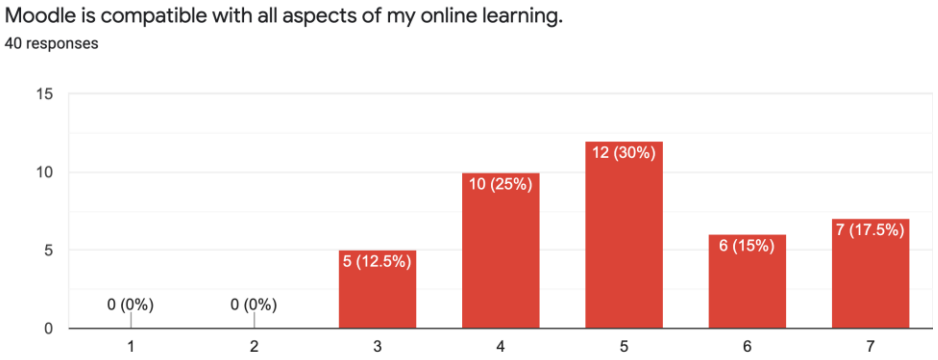
9. Majority (65%) of students who participated in this study prefer to take some online classes when UB returns to face to face teaching. 20% of the surveyed students said that they would take all classes online when UB returns to face-to-face teaching. Lastly, the minority (15%) of students said that they wouldn't take any online classes when UB returns to face-to-face teaching.

10. Minority (27.5%) of students who participated in this study have only been using MOODLE for two semesters, whereas one individual answered that they used MOODLE for 5 semesters already.
11. Majority (72.5%) of students who participated in this study used MOODLE for face-to-face classes prior to the University's move to online learning.

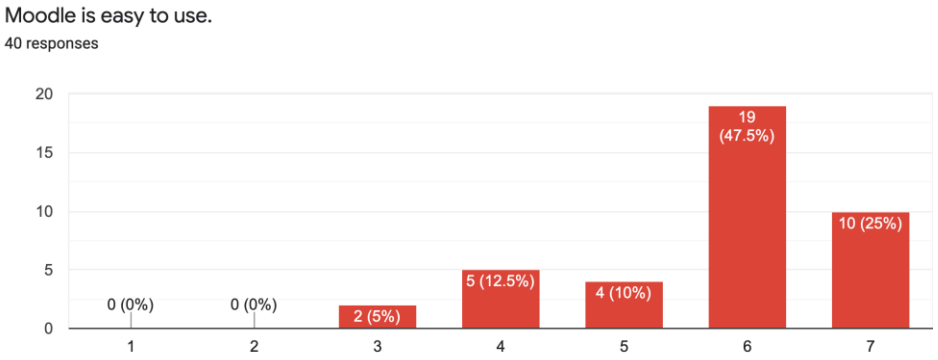
12. Majority (52.5%) of students who participated in this study used an LMS other than MOODLE to learn.

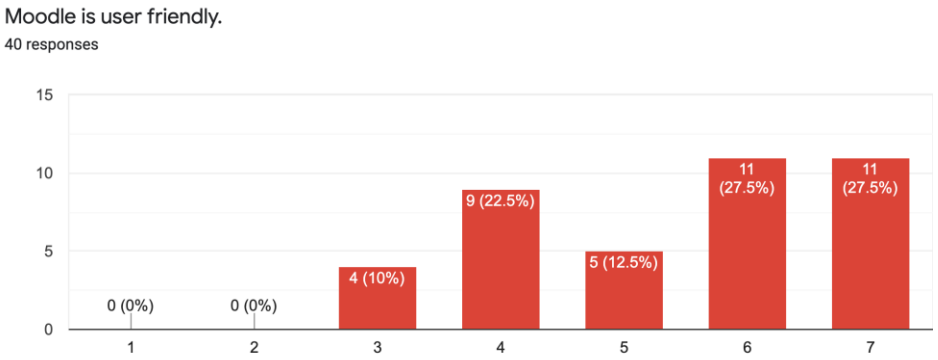


13. This figure shows that the majority of students who participated in this survey somewhat agree that Moodle fits well with the way they like to learn.

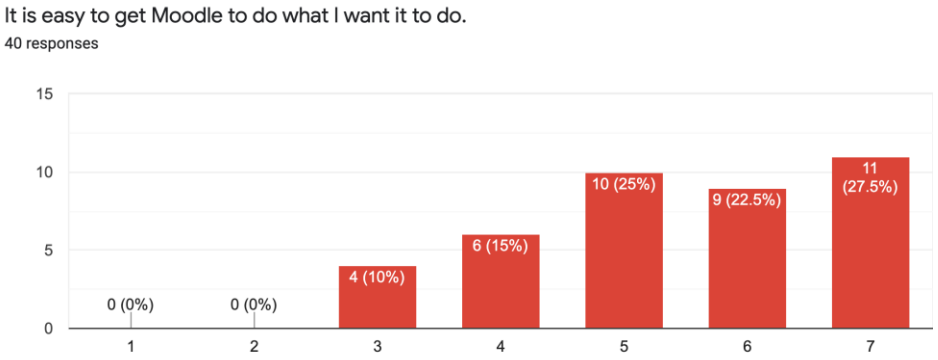


14. This figure shows that the majority of students who participated in this survey strongly agree that Moodle is compatible with all aspects of their online learning.

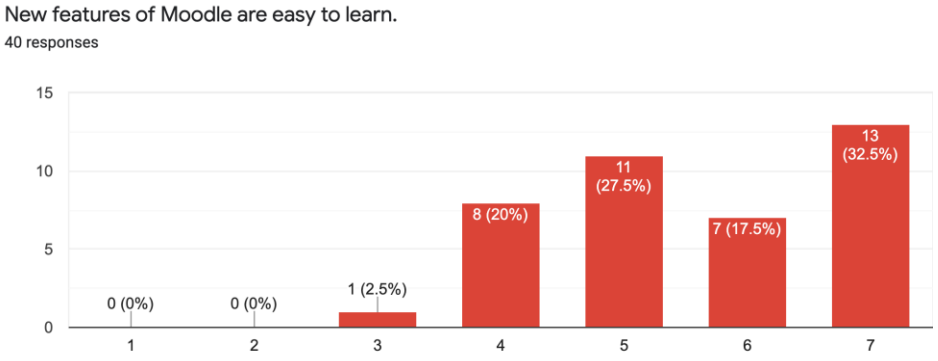


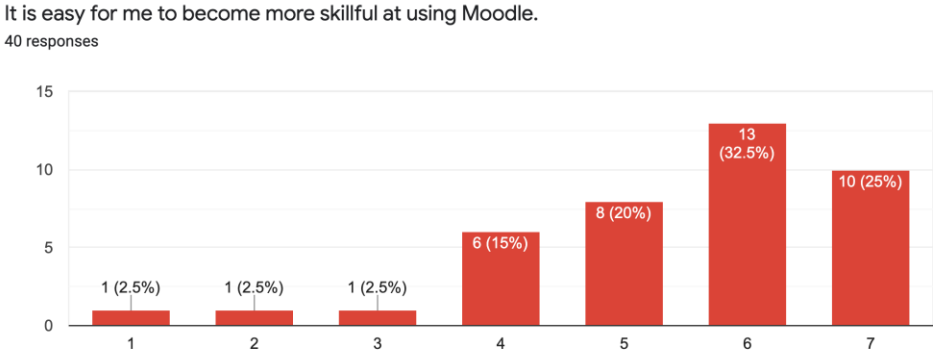


15. These figures show that the majority of students who participated in this survey strongly agree that Moodle is easy to use/user friendly.

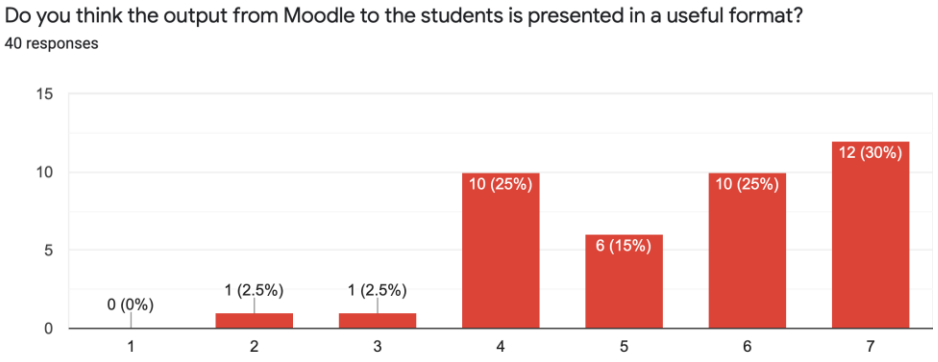


16. This figure shows that the majority of students who participated in this survey strongly agree that Moodle is accomplishing user's wants.

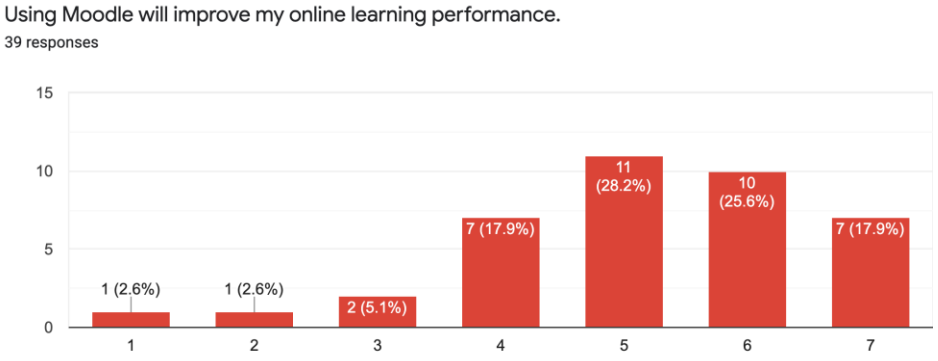


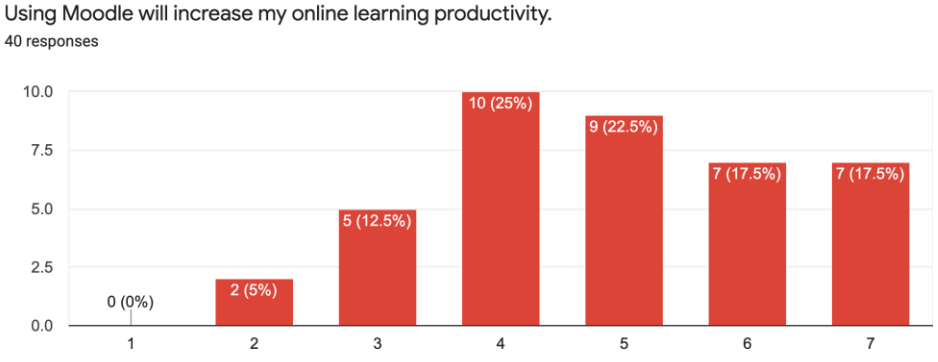


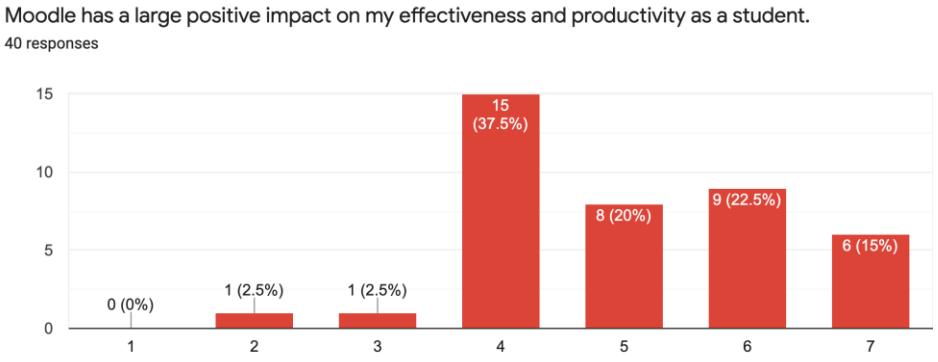
17. These figures show that the majority of students who participated in this survey strongly agree that Moodle is easy to learn and become more skilful at.



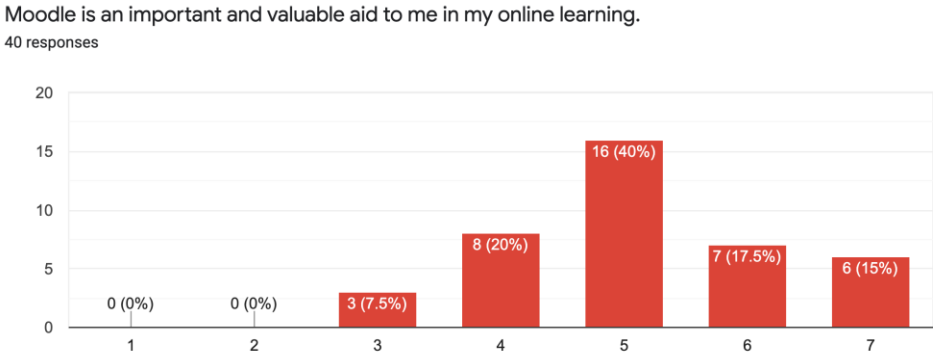
18. This figure shows that the majority of students who participated in this survey strongly agree that Moodle is presented in a useful format.



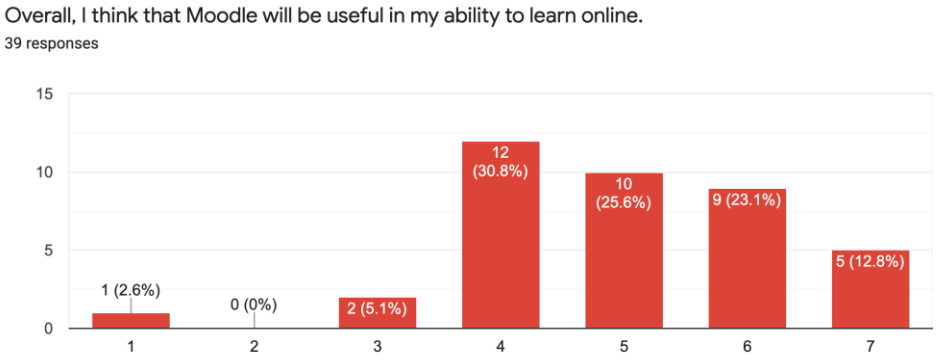


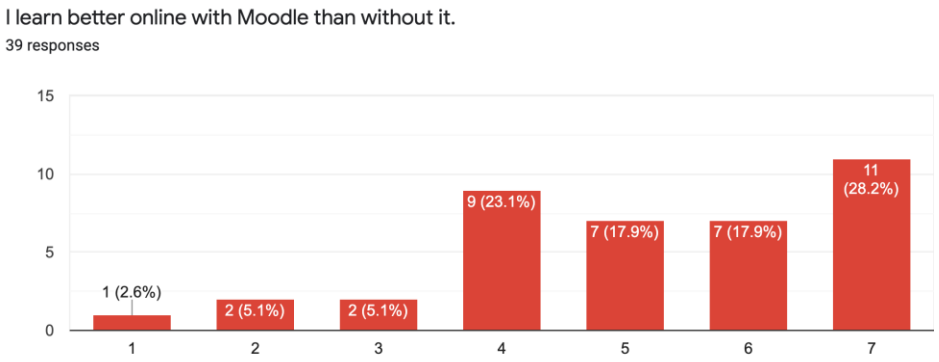


19. These figures show that the majority of students who participated in this survey strongly agree that Moodle will improve their learning performance/productivity.



20. This figure shows that the majority of students who participated in this survey strongly agree that Moodle is an important and valuable aid to their online learning experience.





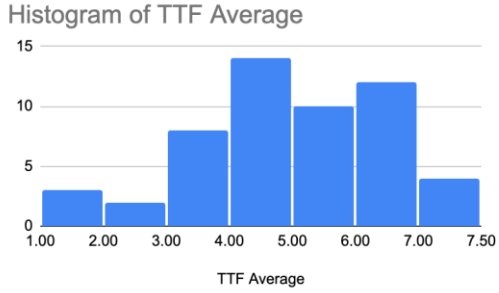
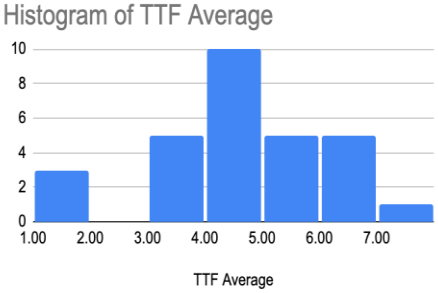
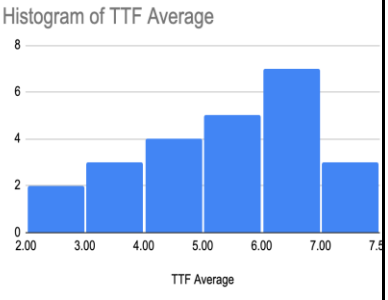
21. These figures show that the majority of students who participated in this survey strongly agree that Moodle will be useful in their ability to learn online. The majority of students also stated that they learn better with MOODLE than without it.

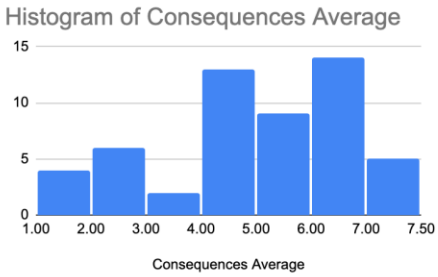
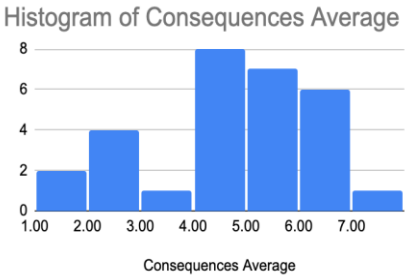
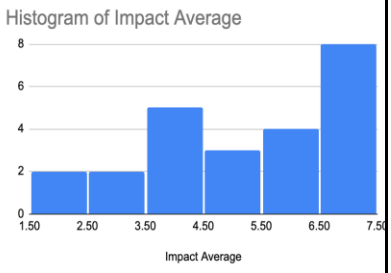
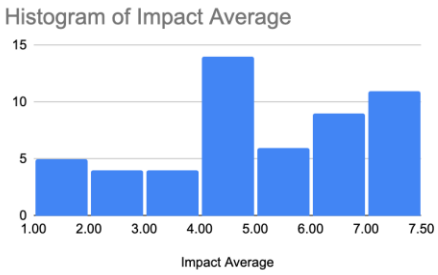
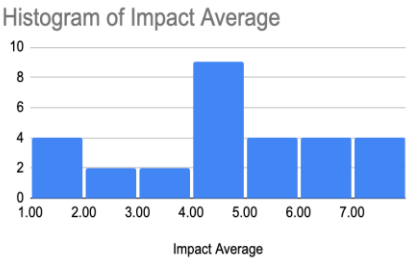
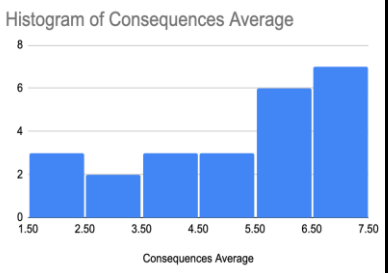
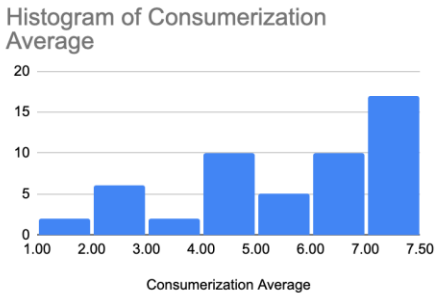
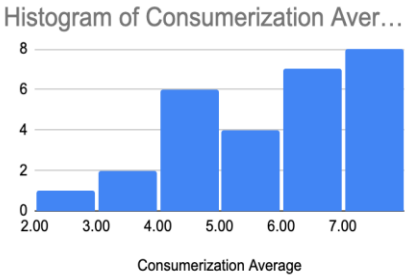
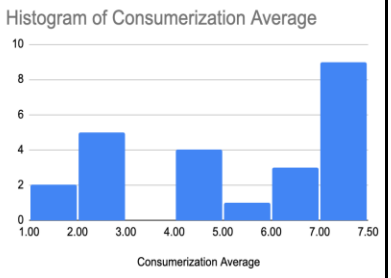
Lecturer's Results

Background Information

Majority of the lecturers who participated in the survey were females (28), while the minority were male (25). Majority (21) of the lecturers who participated in the survey were between the ages of 41-50, while one lecturer(minority) was over 60 years old. Majority of the lecturers who participated in the survey had obtained a Master's Degree already, while the minority (4) had only obtained a Bachelor's degree. Majority (22) of the lecturers who participated in the survey were in the department of FMSS, followed by FST (18), FEA (7) and lastly FHS (5). Their survey answers were collected and carefully analysed. Majority (29) of the lecturers who participated in the survey did not teach one or more online classes prior to the University moving to online classes, while the minority did (24). Majority of the lecturers who participated in the survey used both Moodle as well as google classroom to carry out their teaching tasks.

TTF Lecturer's Responses

	All Responses	Moodle Only (No)	Moodle Only (Yes)
TTF			

Consequence			
Impact			
Consumerization			

We are now transitioning from basic to applied research in the research paper. Following a careful examination of our findings, we discovered that the majority of students and lecturers believe Moodle is a good fit for the way they prefer to work online. Moodle, according to the participants, is compatible with all aspects of their online learning. The main focus of our research was to determine how users experienced MOODLE using it exclusively in wake of the pandemic, to uncover weakness if any, to uncover difficulties or limitations with using MOODLE on such a large scale, to gauge the quality of interactions and impact concerning lesson contents, and to confirm if effective learning was accomplished.

Based on the results, researchers were able to deduce that users felt that MOODLE information systems as it is currently set up at UB is reliable, user friendly, effective and efficient. Researchers were also able to deduce that users believed MOODLE information systems, as they are currently configured at UB, lacked improvement of software, improvement in services and quality improvements.

Based on survey results, it was determined that the majority of the students prefer face to face sessions over learning management systems which they deemed to be more efficient and meaningful/satisfactory in terms of quality of communication, time management and human interaction experiences.

Some issues highlighted by our research are blocking the opportunity for students to access course materials which can be troublesome to students when trying to take quiz and tests. Also, the more students that access the platform the slower the system becomes. Other issues that surfaced were the technical aspects when there is down time, when there is user error or unfamiliarity with using the various features and the assumption that all students had access to an internet connection and a reliable device.

We were able to determine that the majority of students would still be willing to register for an online course if and when normal face to face sessions resumes regardless of their satisfaction with the IS. This may be attributed to the major implication of cost effectiveness and logistics for many students who work and who live far away from campuses.

Based on our discussion, we recommend that lecturers identify more productive means to engage and motivate students to use MOODLE in order to experience true satisfaction. Some alternative approaches or scenarios of revision UB can consider to improve Moodle or motivate usage and encourage satisfaction and better user experiences would be to open a suggestion box to gather feedback from students and to consider features that students might feel would be helpful and discuss with the vendor for further customization.

Conclusion

The University of Belize utilized Moodle to assist and guide with the transition from a classroom setting to an online platform, which should result in a smoother flow of lectures and student feedback. Ultimately, the goal was to improve and simplify the lives of both lecturers and students. The purpose of this study was to determine whether the use of the MOODLE information system was successful in assisting the business in achieving its goals and meeting student expectations.

The data analysis revealed that students relied on Moodle to complete their tasks, indicating that the information system does help the business achieve its objectives. We were also able to establish that the use of MOODLE worked well with other complementary technology which indicates that the use of the information system with the assistance of other technology was indeed satisfactory.

The analysis however indicated that user satisfaction was mediocre as students were not satisfied with their experiences since the schooling environment changed and since the LMS subsequently demanded most of their free time which was not the case previously for in class sessions. The majority of students in this study concluded that studying face to face was more satisfactory and efficient than learning online.

A recommendation for improvement is that it is critical that a structure be established to replace the existing one in order to ensure that the University remains one of the top educational options. Implementing an exceptional learning management system is inevitable as the next step in achieving customer or student satisfaction. Overall, there is much needed improvement to fully satisfy user experience with the LMS and motivation by both lecturers and students is required to fully utilize and maximize all its features.

Limitations

Our limitations of this paper include:
1. The restriction of a more hands on approach in collecting data.

2. Students would state how they feel but cannot provide in depth suggestions/discussions due to limited exposure to the IS or for fear of suggestions being omitted in favour of keeping the IS.

3. Previously available data stated facts about the functionality of the LMS MOODLE only as opposed to evaluating usage and experience against university objectives and desired outcomes
.
4. Inadequate time frame and waiting for the responses of the questionnaires. We did not have sufficient time to run a statistical analysis of the data collected, this includes time to interview as many students and teachers in order to get different perspectives about MOODLE.
5. Privacy policies that the institution has in places limited us in accessing information and fully understanding how MOODLE works from an infrastructure standpoint.

Future Research

In fact, this research accomplishes its goals and provides a continuous understanding of MOODLE's success, but it also reveals its flaws. This emphasizes the advantages of information quality and satisfaction. This research paper's detailed analysis will be theoretical and empirical research that can be used for future research. The limitations can be overcome by placing time frames for every topic and improving in getting more and better results in the questionnaires and also adding or scheduling time for interviews. For future research, in getting at least 85 responses from different branches to get a better understanding and view better results. The limitation can be overcome in the future research.

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Appendices

1. Task–technology fit

- Moodle fits well with the way I like to teach online.
- Moodle is compatible with all aspects of my online teaching.
- Moodle is easy to use.
- Moodle is user friendly.
- It is easy to get Moodle to do what I want it to do.
- Moodle is easy to learn.
- It is easy for me to become more skillful at using Moodle.
- New features of Moodle are easy to learn.
- Do you think the output from Moodle to the students is presented in a useful format?
- Can you provide accurate information to your students with Moodle?
- Can you provide up-to-date information to your students with Moodle?
- Can you provide information students need in time using Moodle?
- Can you provide information that seems to be just about exactly what your students need with Moodle?

2. Expected consequences of LMS use

- Using Moodle will help me to accomplish my online teaching more quickly.
- Using Moodle will improve my online teaching performance.
- Using Moodle will increase my online teaching productivity.
- Using Moodle will enhance my effectiveness as a teacher while teaching online.
- Using Moodle will make it easier to complete my teaching tasks while teaching online.
- Using Moodle will give me greater control over my teaching tasks while teaching online.
- Overall, I think that Moodle will be useful in my ability to teach online.
- Using Moodle will improve the quality of my online teaching.

3. PERCEIVED IMPACT ON TEACHING

- Perceived impact on learning
- Moodle has a large positive impact on my effectiveness and productivity as an online teacher.
- Moodle is an important and valuable aid to me in my online teaching.
- I teach better online with Moodle than without it.

4. Consumerization Attitude - Perceived fit / Expected Performance improvement

- If I could choose my own Learning Managements System…
- PIF_1 …it would fit well with teaching online.
- PIF_2 …it would fit well with helping me to be efficient in teaching online.
- PIF_3 … it would be compatible with my online teaching.