The Effectiveness of Utilizing the Moodle Learning Management System for Students at the University of Belize

Luis Cho
University of Belize
College Street, West Landivar
2015112024@ub.edu.bz

Sasha Cadle
University of Belize
College Street, West Landivar
2018219452@ub.edu.bz

Vivian Cal
University of Belize
College Street, West Landivar
2018118157@ub.edu.bz

Roy Chavez
University of Belize
College Street, West Landivar
2008117000@ub.edu.bz

Shinelly Chan
University of Belize
College Street, West Landivar
2017116949@ub.edu.bz

Sheena Cab
University of Belize
College Street, West Landivar
2018118640@ub.edu.bz

Abstract

It is necessary for schools to invest in information technology (IS) so as to enhance online studies for students. The use of technology has rapidly increased which has created a need to evaluate the performance of Learning Management systems (LMS) used within the University of Belize students. This study is based on the model which focuses mainly on the subject Task technology Fit (TTF) which includes the following categories: Task Characteristics, Technology Characteristics, Individual Characteristics. In connection to these categories, it was further examined the Utilization and Performance impacts to measure the average of Task Technology Fit (TTF), Impact, Consequence and Consumerization. TTF focuses on the match between user task needs and the available functionality of the IT. The purpose of this investigation is to analyze the overall learning platform Moodle that has been instigated at UB's online education for students in order to have successful operational excellence. This research consists of survey data gathered from seventy eight students to measure use and use-related aspects of an e-learning tool. As a result of these findings, it was proposed that the usage of LMS within the educational institution has contributed to increase in consumerization of technology to continue a higher success in e-learning. Therefore, the University of Belize has proven to be even more successful in online studies as it improves productivity and efficiency.

Keywords: Task Technology Fit, Learning Management Systems, Moodle, Performance Impacts, Operational Successes

Introduction

A Management Information System (MIS) is the study of people, technology, organizations and the relationships amongst them. The MIS plays a vital role in the management, administration and operation of an organization as it plays the role of information generation, communication, problem identification and aids in the process of decision-making. In 2020, educational institutions had to adapt quickly due to the Covid-19 pandemic, resulting in an unprecedented boost for online learning. Electronic learning is often abbreviated as E -learning, which can be defined as information and communication technologies - or any learning activity supported by ICT (Sambrook, 2003). The development of information systems (IS) and the internet provides educational institutions and other organizations with the opportunity to access and use technology to complement and support their process of education and learning. Therefore, E-learning has created an Information Communication Technology (ICT) based learning environment for both faculty and students by the conversion of traditional classrooms into an online/digital environment. However, despite the introduction of e-learning systems and their impact on education today, many educational institutions and their users still face implementation challenges due to lack of hardware, fear of technology, and learner isolation (Sambrook, 2003).

Moodle is an acronym for Modular Object-Oriented Dynamic Learning Environment. Developed in 2002 by Martin Dougiamas, Moodle seeks to provide educators, managers, and learners with an open, robust, secure, and free platform for creating and delivering personalized learning environments. Moodle is a user-friendly learning management system (LMS) that supports the learning and training needs of institutions and organizations around the world. The University of Belize adopted the use of Moodle, and information system, for the benefit of their customers, the students. The E-learning platform integrates modules, which enables creation, collaboration, communication, organization, delivery and assessment activities via cloud- accessible anywhere at any time.

The purpose of this research paper therefore is to determine the effectiveness of utilizing the moodle learning management systems for students at the University of Belize. To provide a practical perspective on Moodle, a quantitative research by questionnaires was conducted with student respondents from the University of Belize. The objective of the questionnaire is to seek how efficient, effective and successful the system is currently. The results of the survey then seek to provide the management team of the University with an awareness on the performance of the system (Moodle) used by staff, students and educators. The findings of this research seeks to aid UB's efforts on the improvement of their business functions, information system, strategic business goals and decision-making.

Literature Review

The key purpose of this literature review is to evaluate the use of implementing Learning Management Systems for students. Learning management systems (LMSs) are very widely used in higher education. However, much of the research on LMSs has had a technology focus or has been limited to studies of adoption. In order to take advantage of the potential associated with LMSs, research that addresses the role of LMSs in learning success is needed. Task–technology fit is one factor that has been shown to influence both the use of information systems and their performance impacts (Tanya J. McGill a, Jane E. Klobas b. 2008) Hence, the knowledge is focused on the value of the Task-Technology Fit (TTF) theory which provides a means of quantifying the effectiveness of technology in a system by assessing the relationship between the technology and the tasks the technology aims to support. The theory is widely recognized and has been applied in various ways. According to Spies (2020), the TTF theory has been an important development in IS research and has been widely applied in various environments and on a range of technologies. The research entailed in the analysis and synthesis of the intentions of applying TTF. There were different ranges of categories and it was further analyzed the patterns overtime which demonstrated how the focus of the studies from predominantly theory based to the application of TTF assess a wide range of phenomena.

Today, computer-mediated communication technologies are changing the ability to teach and learn by enhancing interaction with time, distance, and the help of various media, such as text, graphic and voice (Garrison, 2011). However, a main challenge of online education internationally is how to select the right online learning tools for various learning tasks. E-learning is a relatively new form of education that is adopted by different levels of education, especially higher education. Thus, e-learning is becoming the predominant form of education in colleges and universities around the world. A proper theoretical establishment is the Task-Technology Fit model, which suggests that consistency between task characteristics and technology characteristics leads to exceptional task performance and technology utilization (Goodhue & Thompson, 1995). Based on the premise of Task-Technology Fit theory, a U.S.A study Tool Choice for E-Learning: Task-Technology Fit through Media Synchronicity suggests that the effectiveness of student learning in online courses depends on the alignment between two components in developing countries. Furthermore, the formation of such adaptation is conceived through the lens of media synchronicity theory: each type of learning task in the online environment requires a certain level of media synchronicity, and the different tools of e-learning enable different levels of media synchronicity. They are aligned along two dimensions of media synchronicity: the purpose dimension from conveyance to convergence and the process dimension from asynchronous to synchronous. The study posits that media synchronicity mediates the relationship between task and technology. Thus, the selection of e-learning tools suitable for multiple learning tasks will significantly enhance students' learning experiences compared to traditional in-class lectures (Sun & Wang, 2014). Belize, a developing third world country, is struggling to implement technology itself for higher education much less utilizing the appropriate learning tools for various learning tasks. In 2021, at the University of Belize, Lectures possess the option of offering asynchronous or synchronous classes online via Moodle. However, the registration process for students prohibits the option of taking a course asynchronously or synchronously. For example, if a UB student works full time and wishes to take the course of Sociology asynchronously due to time constraint and learning tasks emphasizing independent thinking, then asynchronous communication is the optimal option. However, the only option being offered to the students is a synchronous class on Moodle with allotted class time, attendance and participation. As a result, inappropriate e-learning tool choices may either limit student participation or distract student attention. Therefore, in accordance with achieving higher education online at the University of Belize the e-learning tools need to match the requirements of learning tasks.

In reference to McGill, much of the early research about e-learning consisted of descriptions of LMS implementations. These descriptions were sometimes enhanced by evaluations of the outcomes of the use of the e-learning environments, sometimes in conjunction with a comparison to the outcomes of traditional face to face teaching. This research has considered a range of outcomes in a variety of e-learning contexts. For example, Piccoli, Ahmad, and Ives (2001) compared learning in an LMS environment to learning from face-to-face teaching in the context of basic IT skills training. They found that, while there were no significant differences in performance between students enrolled in the two environments, the e-learning students reported higher computer self-efficacy and were less satisfied with the learning process. By contrast, in similar kinds of studies, Zhang, Zhao, Zhou, and Nunamaker (2004) reported improved academic outcomes for e-learning students, and Chou and Liu (2005) reported that students using their e-learning environment showed improved learning performance and satisfaction. The diversity of results in these studies suggests that, not just the LMS, but also the wider context in which e-learning takes place is an important factor in e-learning success. The theory, Task Technology Fit (TTF), from the information systems discipline, which basically says an IT system is more likely to have a positive impact on individual performance if the system matches the tasks the user must perform. i.e., it's pretty hard to use a spoon to open a can. Related to this is the idea that people like familiarity and avoid the unfamiliar. At least in the context, within the year or so academics are more familiar with Moodle. As all our courses will be expected to have a Moodle presence. The use of Moodle will become a standard part of the task they are expected to perform in running a course.

A Management Information System or MIS is a central data repository capable of not only gathering, organizing, and storing student data but also processing and analyzing it and generating various reports from it (Balram Korde 2020). Moodle as described in "Online Teaching and Learning in Transition: Learning Management System from Blackboard to the Moodle Faculty Perspectives on Moving". This Course Management System (CMS) for short is an Open Source software package designed using pedagogical principles, to help educators create an effective online learning community (Beatty and Ulasewiczz). Moodle is used as a tool for both lectures and students alike both parties can access the material however the lectures play a larger role in the capacity somewhat of administration privileges as they are given back-end privileges. Moodle also has several options for group forum participation. Moodle is a great information system and is very user friendly, the user-interface is smooth and straight forward. The University of Belize also provides a mandatory tutorial for all users of Moodle which provides students with a virtual walkthrough of Moodle and all its functions. Moodle also has the ability to store crucial student data such as personal information and exam records can also keep track of the day-to-day progress of students who are the heart of The University of Belize.

It is very important to focus on the TTF Learning Management systems in developing countries. A study by Melgoza, Mennel, and Gyeszly (2002) shows that, for scholarly research or serious curriculum needs, the use of printed materials was popular among faculty and graduate students of the Departments of Economics, Political Science, and the George Bush School of Government and Public Service at Texas A&M University; while the upper-level undergraduates primarily preferred to use Internet services. In addition, the respondents, whether faculty or students, ranked accessibility as the most crucial factor influencing use of the Digital library (DL), followed by convenience and ease of use. Also, the study by Funmilola O. Omotayo, Abdul Rasaq Haliru (2020) has been able to significantly contribute to the sparse literature on students' use of DL in Nigerian universities by providing information about the fitness of DL technology into the tasks of students. The study equally provides empirical data for further research on other factors (individual characteristics) influencing utilization of DL among students.

Methodology

Moodle Learning Management system has been introduced to the University of Belize Students. It is used by sixty percent of Universities around the world. (RESEARCH, 2019) Moodle is a great tool for tutors because it is a platform to create and save teaching material easily and a collaborative online platform for teachers and students to learn together. This research was conducted to find out the effectiveness of moodle being utilized by students at the University of Belize.

Participants

The University of Belize requires teachers and students to use the Moodle platform. All respondents for this research are the students currently active at the University of Belize across the country. The students from the University of Belize filled out a total of seventy-eight individual questionnaires. At both associate and bachelors level from the Faculty of Education, Health and Sciences, Management and Social Sciences.

Procedure

The study was conducted using qualitative research. A survey questionnaire with seven sections. The questions with respect to experience with Moodle were asked on a seven point linear scale. It consists of fifty questions scaling from one; strongly disagree to seven; strongly agree. It was sent electronically through WhatsApp and emails.

This research paper focuses on the student perspective of Moodle. It focuses more on how satisfied are the students with the service being provided, their learning preferences, the consequences and impact of using moodle. Previous research focused on the University in general including all employees. The survey was limited to just Belmopan Campus.

One of the challenges that arises regarding moodle is the collapse during registration. Even though Moodle was mandatory for both students and lecturers to use they still decided to use other platforms. The implementation of the information and communication technology in education with e-learning through moodle allows improving effectiveness of the education. The accessibility, usability and student collaborative learning can be improved and higher motivation among the students and the teachers can be achieved with proper utilization of Moodle (Chourishi, 2012).

Data Analysis and Discussion

The data gathered for research was taken from 40 females and 38 males for a total of 78 students enrolled in the faculty of FEA, FHS, and FMSS in the 2021 January-May semester. A survey was issued online and Google sheets were used to analyze the results by coding each construct. Each of the histograms explains the results that give a Likert scale of 7 which consists of questions ranging from Yes or No, strongly disagree to strongly agree and the total results of all histograms. These students are located all over the country using the online learning management system platform Moodle that has been provided to them courtesy of the University of Belize. The questions are structured to gather empirical evidence of students' perception of Moodle based on 4 main constructs which are; Task Technology fit, Consequences, Impact, and consumerization, which were placed in 3 categories All responses, Only Moodle, and Not only moodle. The findings are to give a clear understanding of students perceptions on the effectiveness of UB utalyzing Moodle as well as for teachers using an LMS other than Moodle or only Moodle. The data analysis and discussion will be in order of the 4 constructs in the 3 categories.

TTF Analysis

"The Task-Technology Fit theory provides a means of quantifying the effectiveness of technology in a system by assessing the relationship between the technology and the tasks the technology aims to support." (Spies, Grobbelaar, Botha 2020) In the case of Moodle, the data will show students' perception of how effective this LMS is and if it is actually beneficial for online classes. This construct included 13 questions.

Category 1: All Results

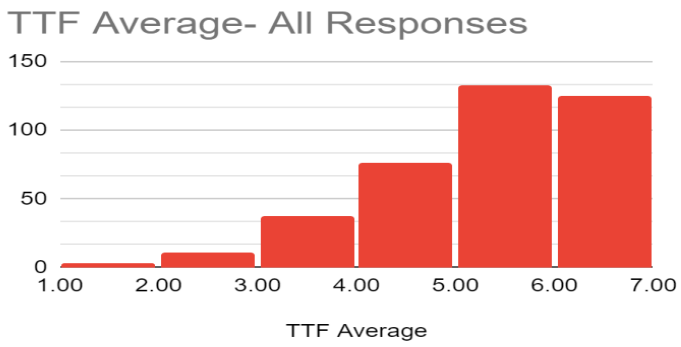


Figure 1: Information on Task Technology Fit average for all results

The chart above explains the UB student's perception on what they think about Task Technology Fit. The data shows that the majority of students strongly agree that Moodle is compatible with all aspects of online learning, it is easy to use, and most students would rather have online classes as opposed to face to face, they find it quite effective. The high ratings indicate that Moodle's TTF is high, which means that moodle is doing the job it was intended to do and that is to offer online learning for the students at UB.

Category 2: Only Moodle

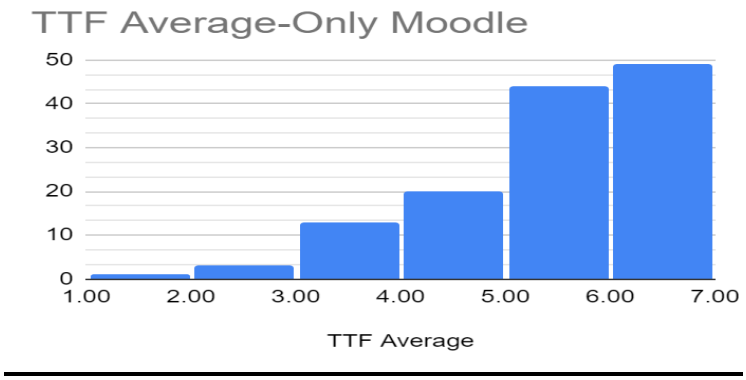


Figure 2: Information on Task Technology Fit average for No

The chart above explains the UB student's overall response on what they think about Task Technology Fit for moodle. Most teachers use only Moodle as a LMS and for the majority of students this LMS is doing the job it is supposed to do. Making it easy for students to learn, they want to continue using moodle for future online classes rather than attending face to face classes. This online platform is allowing students to do work at their own pace wherever they are and it's proven to be overall convenient.

Category 3: LMS other than Moodle

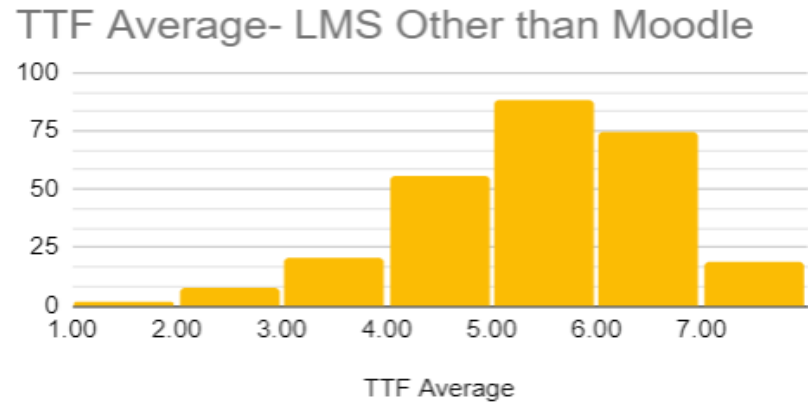


Figure 3: Information on Task Technology Fit average for YES

The chart above explains the UB student's overall response on what they think about Task Technology Fit for moodle along with the use of other LMS incorporated by their teachers or the use of another platform excluding moodle. Majority of the students rated Moodles TTF at 5 which tells us that they would still like to use moodle but are not opposed to using other platforms. While Moodle is convenient and easy to use it still needs to be improved.

Consequences Analysis

Consisted of 8 questions to get a better understanding of students perception when it comes to the benefits of using LMS Moodle as a means to enhance learning, productivity, save time, boost learning, and the overall usefulness of this learning platform.

Category 1: All Responses

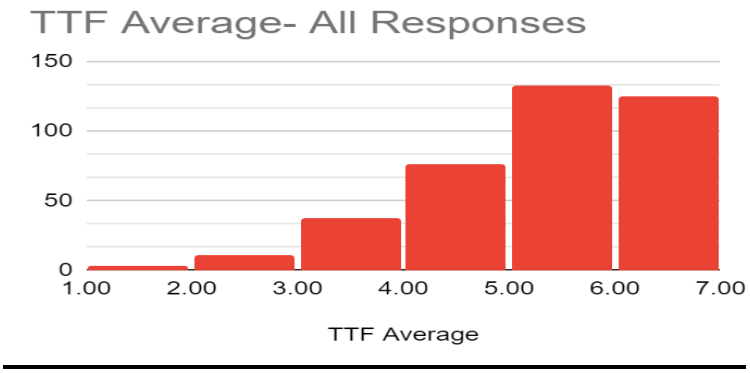


Figure 1.2: Information on Consequences average for all responses

The chart above shows the responses of UB students when it comes to the Consequences of using the LMS Moodle. As a result many students believe that Moodle fits well with the way students like online study. The ratings indicate that most students learned more and that they strongly agree that moodle saves time, makes you more productive and is an overall great LMS.

Category 2: Only Moodle

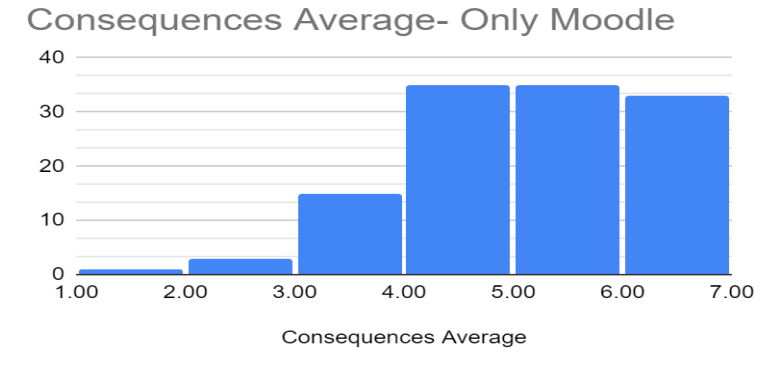


Figure 2.3: Information on Consequences average for Only Moodle.

In the Chart above it shows the responses of UB students when it comes to the Consequences of using only Moodle as a learning platform. Majority of students rated between 5 and 6 indicating that Moodle is just an above average LMS that assists in getting the work done but it needs improvement. A rating of 7 came in second which means that students are content with moodle when it comes to getting work done and viewing materials to learn.

Category 3: LMS other than Moodle

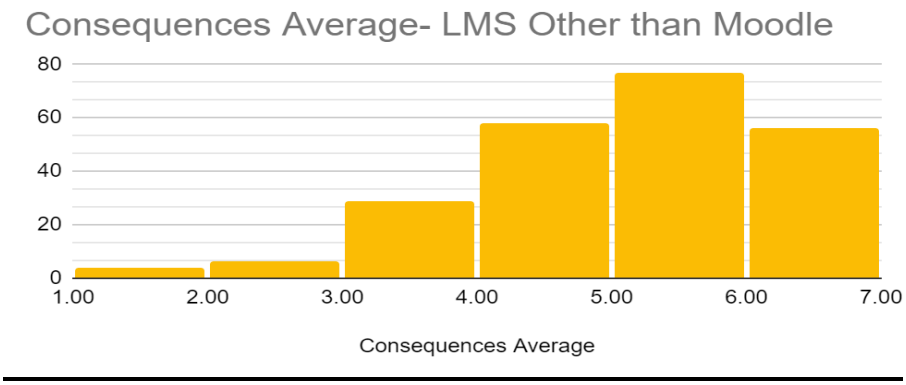


Figure 2.4: Information on Consequences average for LMS other than Moodle.

The chart above shows moodle in comparison to other LMS that teachers use along with it or in replacement of it. Students rated moodle at a 6 letting us know that it is still an overall great platform that allows students to learn, get their work done, provide convenience, work well most of the time and would like to continue doing online classes on moodle.

Impact Analysis

In this section 3 key questions were asked to gain a better understanding of students' perception on the impact or effect Moodle has on their ability to learn and do well in school.

Category 1: All Responses

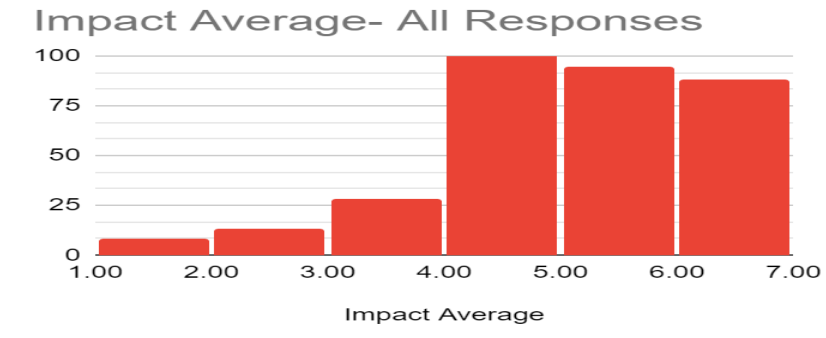


Figure 1.3: Information on Impact average for all responses

As you can see from the chart above, students neutrally agree that moodle is an important and valuable aid to us in online studies but it isn't a major factor that impacts their grades or learning. While for others rating it at 6 and 7, this indicates that students do feel like Moodle plays a vital role in obtaining higher grades and improving learning.

Category 2: Only Moodle

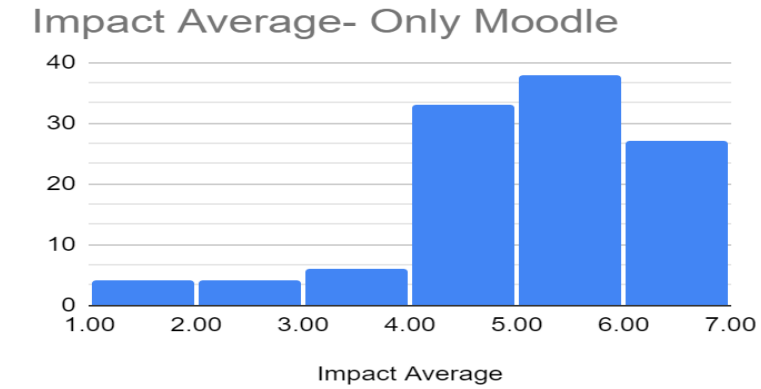


Figure 2.4: Information on Impact average for only Moodle

As we can see from the chart above, teachers who use only Moodle as a LMS, students rated Moodles impact on their ability to learn better and obtain better grades at a high 6.The assessment tasks logically show relationship to each other. Likewise, perceptions of enjoyment and teacher support are related to perceptions of learning and social connectedness amongst students. Students depend on Moodle to get their learning materials in order for them to pass the semester.

Category 3: LMS other than Moodle

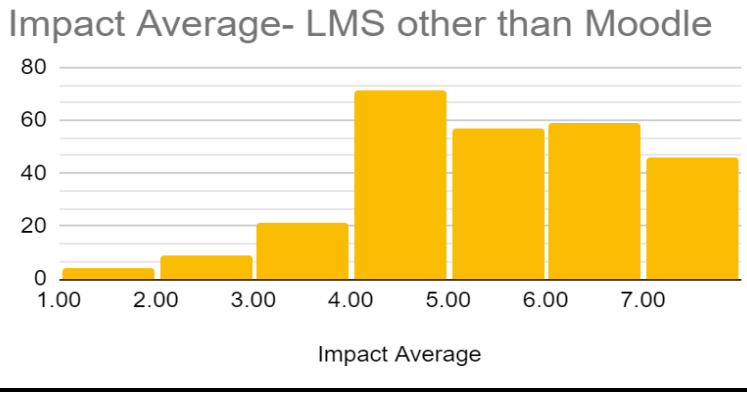


Figure 3.5: Information on Impact average for LMS other than Moodle.

The chart indicates that when teachers use other LMS other than Moodle students rated the impact of moodle at neutral meaning, moodle is not a strong determinant for learning and getting high grades. The main objective is that students need to get the essential learning requirement in order to pass. There are other platforms that can be used that'll offer learning materials like moodle.

Consumerization Analysis

In this section 6 questions were asked to gain a better understanding of students'/ consumers' attitude towards their overall view of Task technology fit LMS and if it is something that is beneficial to their learning.

Category 1: All Responses

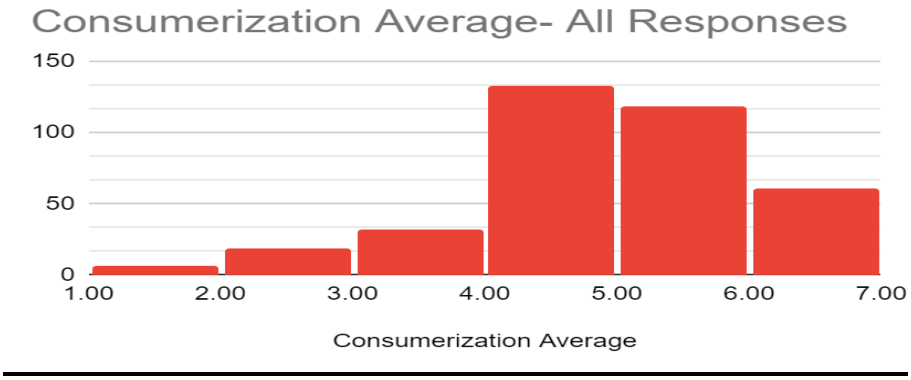


Figure 1.4: Information on Consumerization average for all responses

In this chart above it shows the responses of UB students when it comes to the Consumerization Attitude of Moodle. In the histogram it expresses that many students are neutral when it comes to giving teachers the ability to choose their own Learning Managements System. This implies that students who demonstrate higher levels of learning were no more likely than other students to perceive higher or lower levels of enjoyment, student support or social connectedness. As long as it is compatible with their online learning and it can improve performance.

Category 2: Only Moodle

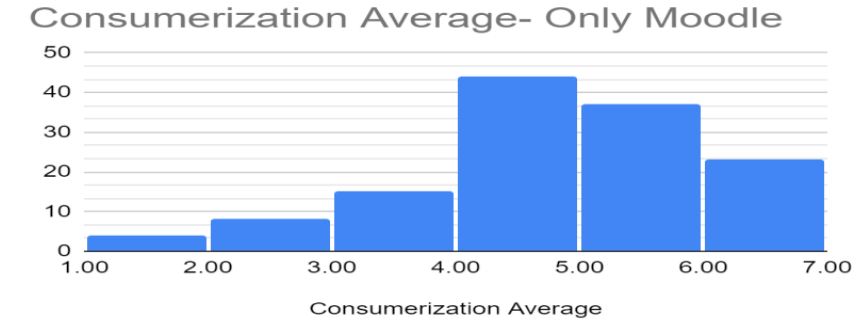


Figure 2.5: Information on Consumerization average for only Moodle

In this chart above it shows the responses of UB students when it comes to the Consumerization Attitude of Moodle when it's the only LMS being used by teachers. Students remain neutral to the fact that teachers can choose their own LMS. Some strongly agree rating at 6 and 7 indicating that teachers should have the ability to choose their LMS because online platforms are after all beneficial to them.

Category 3: LMS other than Moodle

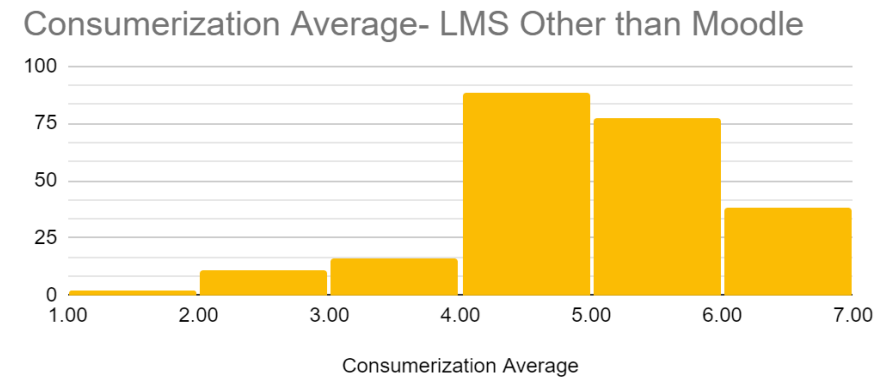


Figure 3.6: Information on Consumerization average for LMS other than Moodle

As we can see in the chart above it shows the responses of UB students when it comes to the Consumerization Attitude of Moodle when it's being used alongside other LMS or as a replacement. Students remain neutral as well when it comes to teachers using other platforms or Moodle. It doesn't make a difference if it is Moodle being used or another LMS system as long as it is going to do the job it is intended to do and that is to cater to convenient learning for students.

Conclusion

This study was conducted using a practical research model; a hypothesis was not tested, relatively the data was gathered through a questionnaire instrument. This was randomly shared solely to students of UB registered for 2021 January to May Semester. The intent was to measure the level of success as well as to gain empirical evidence of students' perception of the Learning System "Moodle" at the University of Belize. This was divided into four main constructs which are; Task Technology fit, Consequences, Impact, and consumerization, which were placed in 3 categories All responses, Only Moodle, and Not only Moodle. There is a high overall TTF rating which indicates that Moodle is doing the job it was intended to do and which is to offer online learning for the students at UB.

Limitations and Future Work

There were several limitations that influenced the results of this research. The sample size was small-scaled to 78 students attending the University of Belize from the FEA, FHS and FMSS campuses; this gives an average of 26 students per campus that participated. With that said, results lacked some consistency, not enough students were given the opportunity to participate in the questionnaire. A second limitation given due to the fact that each researcher had to meet the time constraints placed on the deadline for this assessment which had to be issued one week before and during the Easter Break. This also contributed to low participants. The third limitation that we experienced with this survey is based on feedback given to the reaches from the students who attempted to complete the questionnaire. There were complaints of the survey being lengthy as it was seven pages long. Future work can utilize a longer timeframe to gather a greater sample size, this will allow for information to be closer to accurate as researchers' would then be gaining feedback from a larger student base.

Recommendations

To alleviate any dilemma we are recommending that the University fosters better user interface, incorporating live chat as a means of direct communication to the lecturer and information sharing from lecturers to students. All educational institutions should require a user-friendly and efficient MIS system to take the institution a step further in the right direction. Core needs and other values and standards aside, every forward-thinking educational institution must implement a solid LMS platform to fully utilize and efficiently track their resources and provide a hassle free-learning experience to its students.

References

Balram, Korde. *Role of Management Information System (MIS) In Education Sector.* Role of Management Information System (MIS) In Education Sector **(blog)**, 25 December 2020, https://www.iitms.co.in/blog/role-of-management-information-system-in-education.html

Beatty, Brian, and Connie Ulasewiczz. "Faculty Perspectives on Moving from Blackboard to the MoodleLearning Management System. TechTrends: Linking Research & Practice to Improve Learning, 50(4),36-45. Springer Science & Business Media B.V. Retrieved from 10." TechTrends: Linking Research & Practice to Improve Learning , vol. 50, no. 4, 2006, pp. 36–45, doi:10.1007/s11528-006-0036-y.

Chou, S.-W., & Liu, C.-H. (2005). Learning effectiveness in a web-based virtual learning environment: A learner control perspective. Journal of Computer Assisted Learning, 21(1),65–76

Chourishi, D. (2012). Effective E-Learning . Effective E learning through Moodle, 38.

Christianson, L., Tiene, D., & Luft, P. (2002). *Examining online instruction in undergraduate nursing education.* Distance Education, 23(2), 213–229.

Funmilola O. Omotayo, & Abdul Rasaq Haliru. (2020) *Perception of task-technology fit of digital library among undergraduates in selected universities in Nigeria*. The Journal of Academic Librarianship, 2020 1-10

Garrison, D. R. (2011). E-Learning in the 21st Century: A Framework for Research and Practice, (2 ed.). New York, NY: Routledge.

Goodhue, D. L., and Thompson, R. L. (1995). Task-technology fit and individual performance. MIS Quarterly, 19 (2), 213- 236

Harris, M. J., & Rosenthal, R. (1985). *Mediation of interpersonal expectancy effects*: 31 meta-analyses. Psychological Bulletin, 97(3), 363–386.

doi:10.1037/0033-2909.97.3.363

Melgoza, P., Mennel, P. A., & Gyeszly, S. D. (2002). *Information overload*. Collection Building, 2002, 32-43

Piccoli, G., Ahmad, R., & Ives, B. (2001*). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training*. MIS Quarterly, 25(4), 401–427

RESEARCH, G. &. (2019, September 19). Moodle. Retrieved from https://www.lambdasolutions.net/guides-and-research/moodle-user-guide-intro-to-moodle: https://www.lambdasolutions.ne

Ruan S., Sara G., & Adele B., (2020) *A Scoping Review of the Application of the Task-Technology Fit Theory*. Lecture Notes in Computer Science book series (LNCS, volume 12066) (2020). Springer, Cham. https://doi.org/10.1007/978-3-030-44999-5_33

Sambrook, S. (2003). E-learning in small organisations. Retrieved from researchgate.net: https://www.researchgate.net/profile/Sally-Sambrook/publication/235251076_E-Learning_in_Small_Organisations/links/0046351db03bec4d4f000000/E-Learning-in-Small-Organisations.pdf

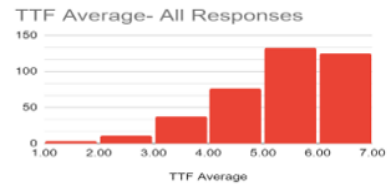
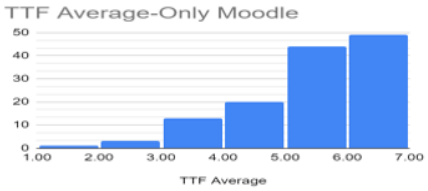
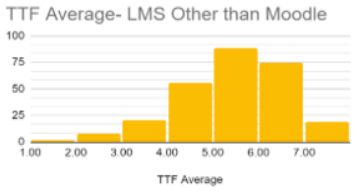
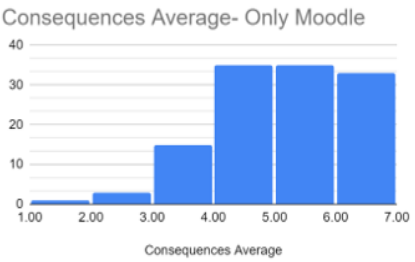
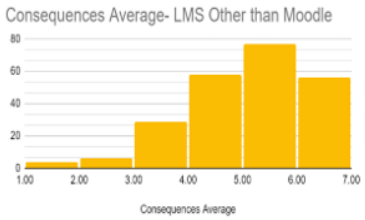
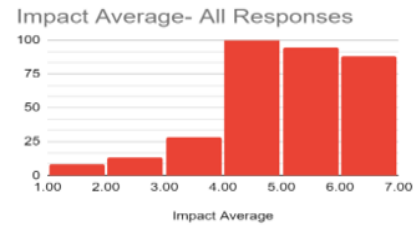
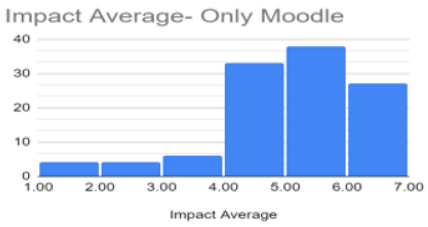
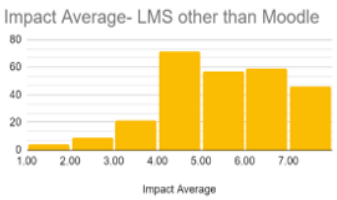
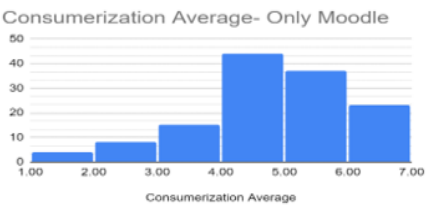
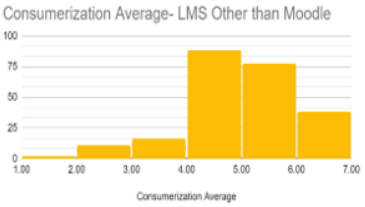
Spies R., Grobbelaar S., Botha A. (2020) A Scoping Review of the Application of the Task-Technology Fit Theory. In: Hattingh M., Matthee M., Smuts H., Pappas I., Dwivedi Y., Mäntymäki M. (eds) Responsible Design, Implementation and Use of Information and

Sun, J.,and Wang, Y. (2014, July). Tool Choice for E-Learning: Task-Technology Fit. Retrieved from files.eric.ed.gov: https://files.eric.ed.gov/fulltext/EJ1140775.pdf

Tanya J. McGill a, Jane E. Klobas b., (2008) *A task–technology fit view of learning management system impact*. Computers & Education 52 (2008) 496–508

Zhang, D., Zhao, J. L., Zhou, L., & Nunamaker, J. F. (2004). *Can e-learning replace classroom teaching? Communications of the ACM*, 47(5), 75–79.

Appendix

	All Responses	Only Moodle LMS	LMS other than Moodle
TTF	Figure 1 	Figure 2 	Figure 3 
Consequences	Figure 1.2 	Figure 2.3 	Figure 3.4 
Impact	Figure 1.3 	Figure 2.4 	Figure3.5 
Consumerization	Figure1.4 	Figure 2.5 	Figure 3.6 

Survey used
https://docs.google.com/forms/d/e/1FAIpQLSciHcVgggdFWD7DDEbgn99Lyl2yyP8h9ghpL9gXI-RaCYiwBw/viewform