Measuring the Success of the Moodle Management system at the University of Belize

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Abstract

The Moodle system, implemented by the University of Belize is created to provide an online educational platform for students. The main purpose of this study was to assess the success of the Moodle information system using the DeLone and McLean IS model and to determine the effectiveness of the model in measuring the success of the system. The model consists of six dimensions: namely, information quality, system quality, service quality, use, user satisfaction, and perceived net benefit. In order to gather data, thirty questionnaires were distributed to students who use the Moodle system. Based on the results gathered it show that the Moodle system is efficient and effective meeting users expectations, therefore the system is useful and can be beneficial to users. In addition, it can be stated that the eleven hypotheses were valid based on the results.

Keywords: information system, information quality, system quality, service quality, use, user satisfaction, perceived net benefit, D&M Model, Moodle

Introduction

Given that, the University of Belize is a national university; and is automatically a common choice for many students for their tertiary level education advancement, it is imperative to ensure a high level of effectiveness regarding student's learning. This can be achieved by providing improved online learning systems. The level of effectiveness contributes to the learning experience of students, which may eventually lead to them producing better grades and a higher GPA. Likewise, the University of Belize benefits by gaining popularity and becoming the leader in tertiary level education. Currently, the University of Belize serves approximately 4,600 students (Ministry of Education Statics at a Glance, 2014-2015) and receives approximately $12 million per fiscal year (University of Belize annual report, 2011-2012) from the Government of Belize to assist with its operational costs. With the student population continuously growing, it makes sense that now more than ever; the university should consider improving how students learn.

In recent years, e-learning has been becoming increasingly interesting for society and educational institutions because it supports the concept of lifelong learning and since knowledge is becoming more and more important. Different education programs around the world cater to this increased demand and offer new forms of education that are frequently supported by information and communication technology (ICT) (Sulčič, 2009). Note that the emergence of new technologies, the rapid expiration of knowledge and training, the necessity of just-in-time information delivery, and the need for more cost-effective teaching methods have transformed teaching-learning practices. In comparison to traditional classroom instruction, the major advantages of e-learning are reducing geographical barriers as well as travel and program overhead costs. , therefore, adapts the time and space of the study process (N. de Jong, 2013). The access becomes more flexible, from anywhere and usually at any time.

On the other hand, there are also problems that make e-learning ineffective. Many students drop out of online courses due to a lack of motivation, instructional design-related factors and learning style mismatch, time conflicts with other commitments, organizational support, and follow-up on completion (Wang, 2003). Other problems connected with e-learning are the absence of significant differences in acquired knowledge, the unsuccessfulness of e-learning projects and inappropriate attitude of instructors (Selim, 2015)... The purpose of the paper is to analyze how effective the introduction of the Moodle e-learning System is as part of the teaching process at the University of Belize.

Literature Review

Many schools today are moving away from the traditional method of providing information to their students. They are now moving towards providing information, through technology, more specifically, the Moodle system. According to a website entitled Moodle, Moodle is a learning platform designed to provide educators, administrators, and learners with a single robust, secure, and integrated system to create personalized learning environments (Moodle Partner, 2018). Within this literature review, the researchers will be evaluating the effectiveness of Moodle systems that are implemented within various schools around the world. Additionally, this Literature Review will also focus on how the Moodle system at the University of Belize is compatible with the aspects established by DeLone and McLean module (2003).

The DeLone and McLean module is a widely known element that various researchers use in order to evaluate the success of various information systems. According to the author of the article, "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update", the main purpose of this aspect was to synthesize previous research involving IS success into a more coherent body of knowledge and to provide guidance to future researchers (2003). In order for these future researchers to report on these various systems, they need to have knowledge about various success factors. These success factors is an important implication for the measurement, analysis, and reporting of IS success in empirical studies of information systems. ((DELONE & CLEAN, 2003))These factors are the system quality, information quality, use, user satisfaction, individual impact, and organizational impact.

The article entitled, "Effectiveness of Moodle- Enabled Blended Learning in Private Indian Business School Teaching Niche Program", this article is based on a quantitative study used to analyze the effectiveness of Moodle when used by the faculty and students of a private Business School in India teaching niche programs. The researchers of this study, Dr. Ela Goyal, and Dr. Suhas Tambe concluded through this study that 72% of the students were very positive about the distribution of notes through this forum.

Similarly, 89% of the students felt that this was a good tool for uploading class assignments and submitting reports. 82% of the students felt that Moodle was a good way of marking attendance. 83% of the students also stated that this was a good system of putting up class notices. However, when it came to class assessments approximately only 40 % felt that this tool was good for conducting objective and subjective tests while 25-31% felt that this was not a good tool at all (Goyal & Tambe, 2015).

According to another article by (Novo-Corti, 2013) When measuring students' performance with other measures, it reports an increase in the performance of students (grades and qualifications) when using the mixed technology of e-learning in Moodle and face-to-face lectures. Similar, to what Novo-Corti stated, (Hsu) added in her study that face-to-face learning grouped with E-learning channels the gap between students and instructors. It also mentioned that students enjoy taking courses, which includes the use of Information Technology because activities offered through e-learning systems are more useful and valuable as compared to traditional classroom activities. A study on the use of Moodle in Higher Education reported from Saudi Arabia revealed that it is used mostly for sharing and distributing learning materials. Most of the participants found it easy to use and were highly satisfied. Teachers appreciated the possibility of an out-of-classroom communication with students, and the ease with which the resources could be managed digitally and provided to the students at all times. (Daoud, 2007).

Another study relating to the topic, which tests the effectiveness of Moodle, was done for an English language course in Slovenia, which showed that the Moodle platform was helpful, useful, and timesaving. Overall, it had a positive influence on the students' language learning. Upon further examination of Moodle, it was determined that all participants in the study downloaded lecture notes and homework activities (Zoran, 2010).

To conclude, all studies evaluated, reported that students found Moodle and other learning management systems useful within the classroom, for not only the students but the teachers as well. The researchers expect to ascertain the same type of responses when the investigators conduct their own study. The researcher's contribution to the topic will be testing how effective Moodle is in regards to different aspects for example information quality, service quality, and others found in the DeLone and McLean module, which makes the research slightly different from others done before.

Research Module/Hypothesis

It is important for individuals who create various information systems to determine whether these systems are successful or not. To determine this, individuals utilize various ID Success Measures to determine what users view their information system in order to decrease failures and to improve success. However, for this research investigators will be utilizing the Delone& Mclean module that focuses on six distinct dimensions of information systems success.

Various ID Success measures are updated as time goes by. Same can be said about the DeLone& McLean IS Model, which was updated and reviewed ten years after first publication. This model utilizes various factors such as 'System Quality', 'Information Quality', 'Use', 'User Satisfaction', 'Individual Impact' and 'Organisational Impact'.to determine whether these systems are effective or not.

"Systems quality" are factors of an information system based on performance. System Quality is based on aspects such as adaptability, availability, and reliability, etc. On the other hand, "Information quality "are factors based on the type of information the system is able to produce. This dimension comprises of aspects such as; completeness, ease of understanding, relevance, etc. "Service quality" represents the support that users obtain such as the system is up to date, solve system issues on time, etc.

The factors use and user satisfaction is seen to be similar because it encompasses how often individuals utilize the information system as well as the level of satisfaction that it generates while utilizing it. On the other hand, net benefits are determining whether the information system allows individuals to accomplish the goals of the organization. Through the use of these six dimensions, researchers will determine the various hypothesis below:
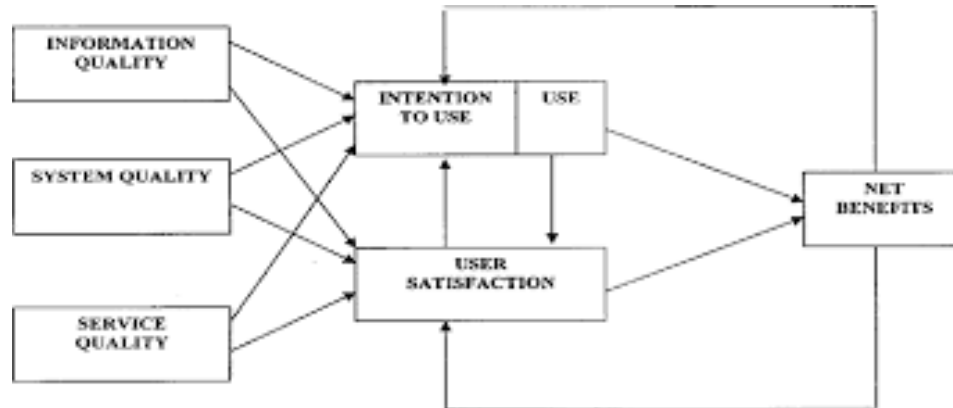
Figure 1 DeLone and McLean Information System Success Model

Hypothesis:

- H1. Complementary technology quality will positively impact system use.
- H2. Computer self-efficacy will positively impact system use.
- H3. System quality will positively impact user satisfaction.
- H4. Information quality will positively impact user satisfaction.
- H5. Service quality will positively impact user satisfaction.
- H6. The use will positively impact user satisfaction.
- H7. Information quality will positively impact use.
- H8. System quality will positively impact use.
- H9. Service quality will positively impact use.
- H10.User satisfaction will positively impact the perceived net benefit.
- H11.The use will positively impact the perceived net benefit.

Methodology

This research was done through a random sampling method that included 30 participants from the University of Belize. This type of sampling method was utilized by the researchers since it was convenient for them. By this method, every individual or student at the University of Belize had an equal chance of being selected for this research paper.

In addition, the Researchers used the DeLone and Mclean theory model that included subtopics such as user satisfaction, information quality, service quality and so on to carry out this investigation. A total of 30 questionnaires were issued to the sampling frame that represented the researcher's target population.

This study used a quantitative and qualitative method, using the questionnaire that can be found in the appendix to obtain the data necessary to carry out this research. The questionnaire composed of a Likert Scale which for every section of the questionnaire which made it easier for the participants to answer the questions in an effective and fast manner.

The questionnaires were issued by two researchers, 15 each, in which one targeted the FMSS faculty and the FEA faculty while the other researcher targeted the FST and FNASHW faculty at the University of Belize in the Belmopan Campus. The participants were given 15 minutes to answer the questionnaires by rating each question or statement.

The Data gathered would then be analyzed by the researchers using Microsoft Excel, where they would display and discuss the different sections via charts, graphs, and tables to carry out effective data analysis.

Data Analysis

Table 1 Characteristics of Respondents		
Characteristics	Number	Percentage
Gender		
Male	11	36.6%
Female	19	63.3%
Total		
Age		
16-19	9	30%
20-25	17	56.6%
25-30	0	
31 and Above	4	13.3%
Education		
Bachelors	17	56.6%
Masters	0	
Associates	13	43.3%
Faculty		
FMSS	8	26.6%
FEA	10	33.3%
FST	7	23.3%
FNAHSW	5	16.6%

Table 1. Respondents Characteristics

The data was gathered from a sample of the University of Belize Central campus. A 5-point Likert type Scale was used ranging from strongly agree (5) to strongly disagree (1). Table 1 entitled Characteristics of Respondents depicts that most of the respondents were female were 63.3% while 36.6% of the respondents were males. The results indicate that 56.6% of the respondents were between the years of 20-25. However, majority of the respondents, which is 56.6%, has a Bachelor's Degree. On the other hand, 43.3% of respondent possess an Associate's Degree while no one holds a Master's Degree. Additionally, the majority of the respondents are from FEA (33.3%), while the least respondents are from the FNASHSW (16.6%).

Information Quality
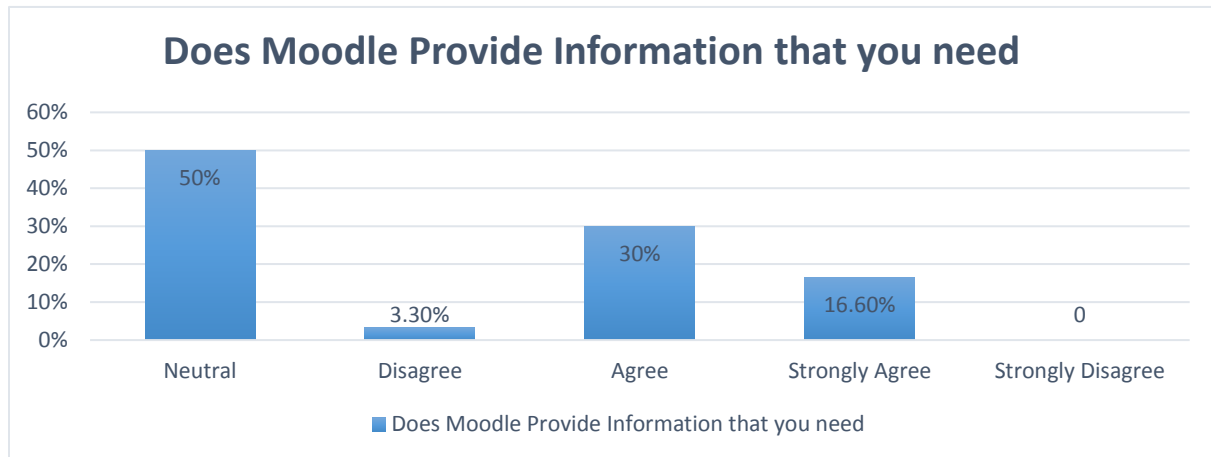
Figure 2. Does Moodle Provide Information you need

Figure 2 depicts the responses that students had on whether they believe that Moodle provides information that is needed. Based on this question, 50% of the respondents were neutral, while 30% of the respondents agreed that that the system provides information that is needed. On the other hand, 16.6% of the respondents strongly agree that Moodle provided information that is needed. Finally, 3.30% of the respondents disagreed that Moodle provided information that is needed. This result signifies that most students are not sure about whether or not the system provides information that is needed.
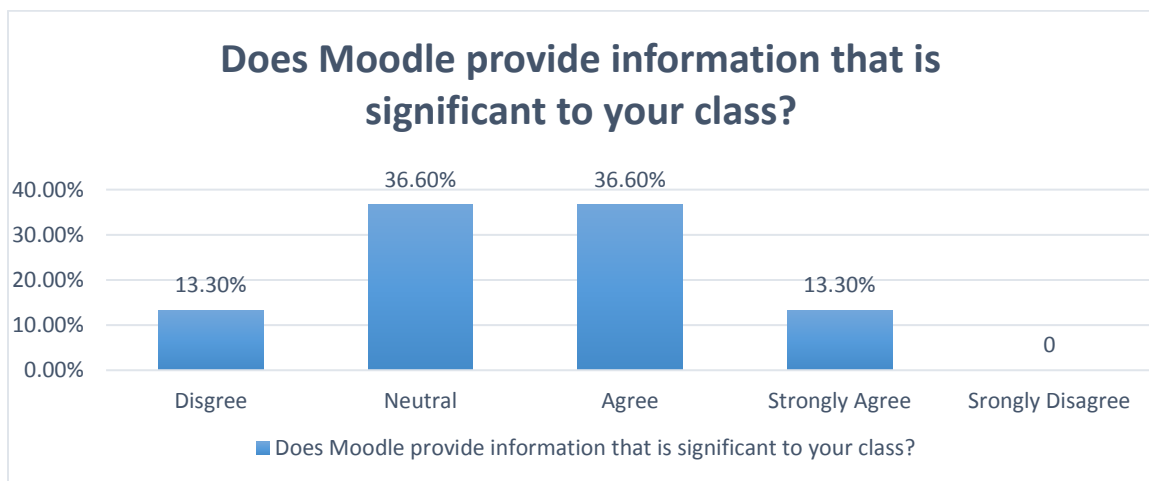
Figure 3. Does Moodle provide information that is significant to your class?

The Bar Chart above depicts the response of respondents on whether the Moodle system provides information that is significant to the different classes. Based on this question, 36.60% of the individuals were neutral as well as they agreed that the system provides information that is significant to classes taken. Furthermore, 13.30% of respondents stated that they both disagree and strongly agree that the system is significant to classes taken. Both neutral and agree options were the same. Therefore, this result signifies that students are not sure whether the system provides information that is needed for their class and they agree that the system provides information that is needed.

System Quality
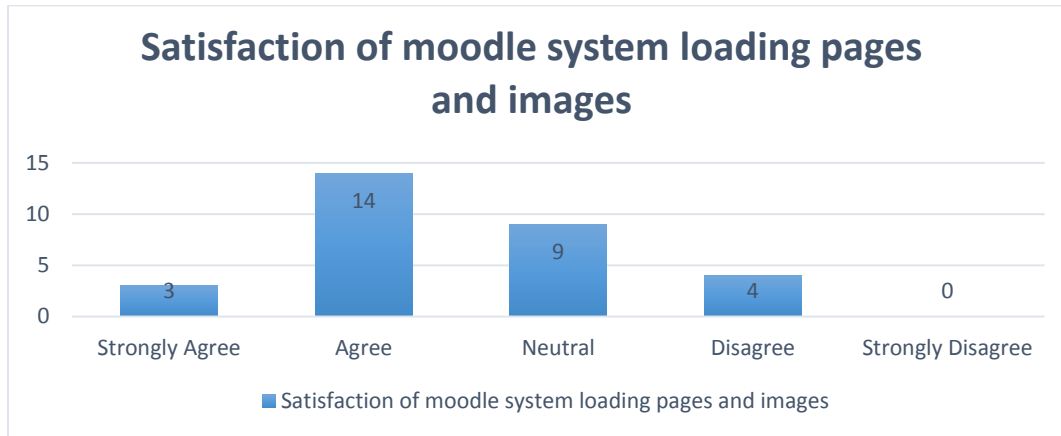
Figure 4. The satisfaction of Moodle system loading pages and images.

Figure 4 represents the various responses of individuals who stated whether they were satisfied with the Moodle system loading pages and images. 30% of the respondents stated they were neutral with this question, while 47% of the respondents stated that they agree to be satisfied with Moodle system loading pages and images. However, 13% and 10% of the respondents stated that they disagree and strongly disagree with the satisfaction of the system loading pages and images. This result signifies that students of the University (47%) agree that they are satisfied with the system loading images and pages.
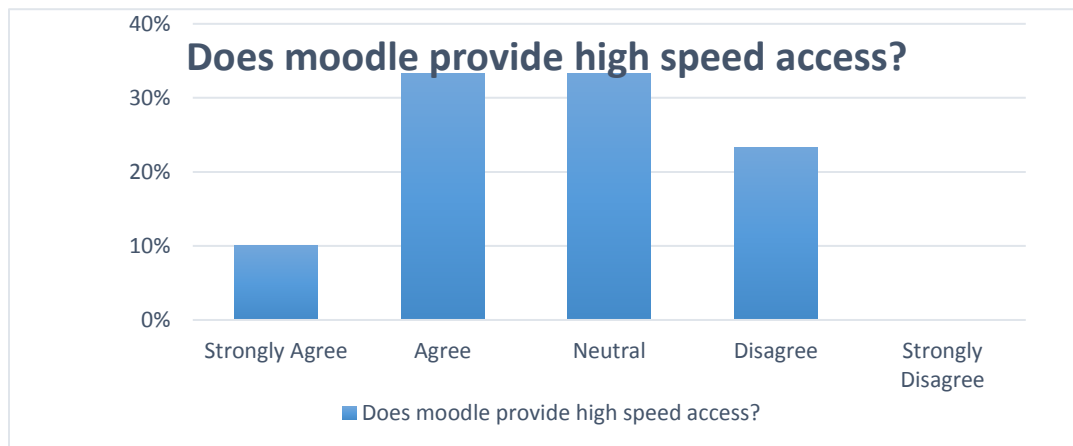
Figure 5. Does Moodle provide high-speed information access

Figure 5 represents responses of individuals on whether Moodle provides high-speed access. Both responses "neutral" and "Agree" are tied at 33.30%. This signifies that the majority of the students agree or are neutral on whether they believe the system provides high-speed access. On the other hand, 23.30% of the respondents disagree that the system does not provide high-speed access. While, 10% responded that they strongly agree that the system provides high-speed access Once again, both neutral and agree are the same percentage. Therefore, this result signifies that individuals are not sure whether the system provides high-speed access and they also agree that the system provides high-speed access.

Service Quality
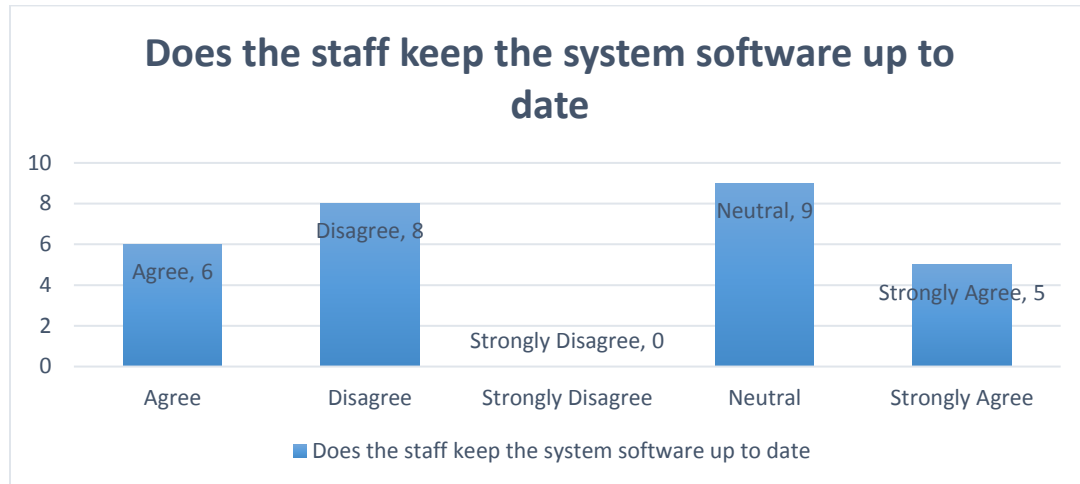
Figure 6. staff keep the system software up to date

Figure 6 represents responses of individuals on whether the staff keeps the system software up to date. 29% of individuals disagree that staff does not keep the system up to date while 32% of respondents stated that they were neutral on whether the staff keeps the system software up to date. On the other hand, 21% agreed and 18% strongly agreed to the statement. However, no individual strongly disagree with the question. Again, this result signifies that individuals are not sure whether the staff keeps the system software up to date. However, it is important to note that the second highest percentage the disagree option. This can signify that they are various individuals that don't believe that system software is kept up to date.
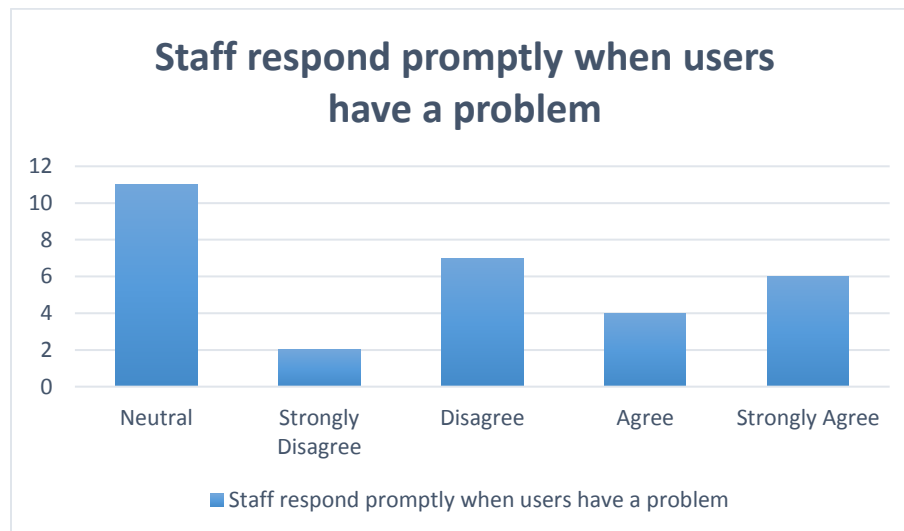
Figure 7. Staff respond promptly when users have a problem

Figure 7 represents responses of individuals on whether the Staff responds promptly when users have a problem. Most of the individuals were neutral (11) based on this question. While individual (7) disagreed with this question. Additionally, 6 individuals strongly agree with this statement while 4 agrees and 2 individuals strongly disagreed. This result signifies that many individuals are not sure whether the staff responds promptly when users have a problem. Also, it is important to note that the second highest response was that many individuals did not believe that the staff responds promptly to the problem.
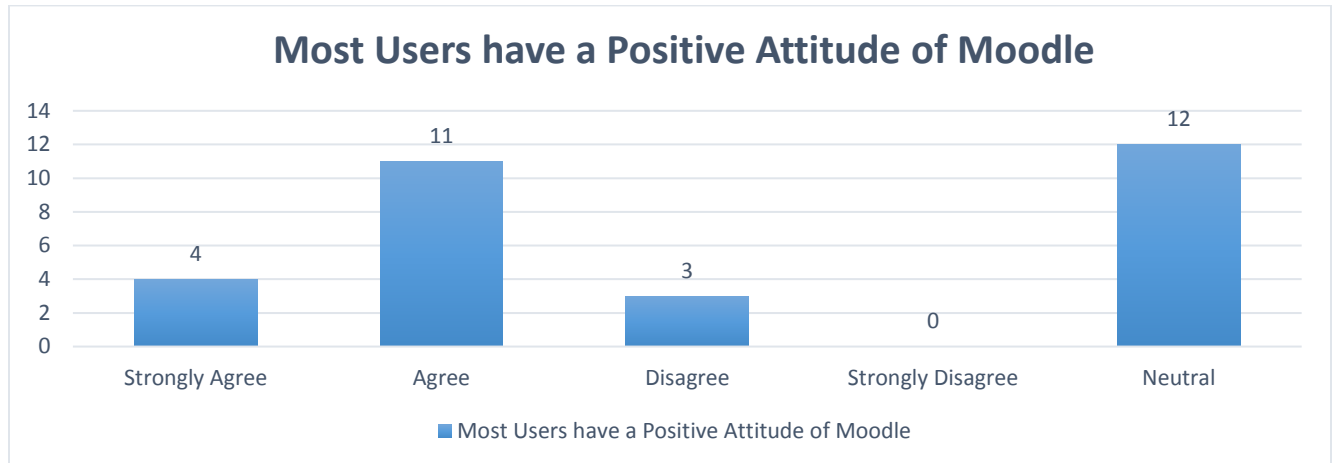
User Satisfaction

Figure 8. Most user neutrally agree that they have a positive attitude of Moodle

Figure 8 represents the results of individuals on whether they have a positive attitude of the Moodle System. As the chart shows, 40% (12) of the target population were neutral on this question, while 37% (11) being the second highest agree that they have a positive attitude of Moodle. On the other hand, 13% (4) strongly agreed, 10% (3) disagreed and 0% (0) strongly agreed. Now, out of the 40% (12), 4 individuals were from the FNAHSW department being the highest, 2 from the FEA, and 3 individuals for both the FST and the FMSS department. This means that most of the individuals are not sure whether they have a positive attitude of Moodle.
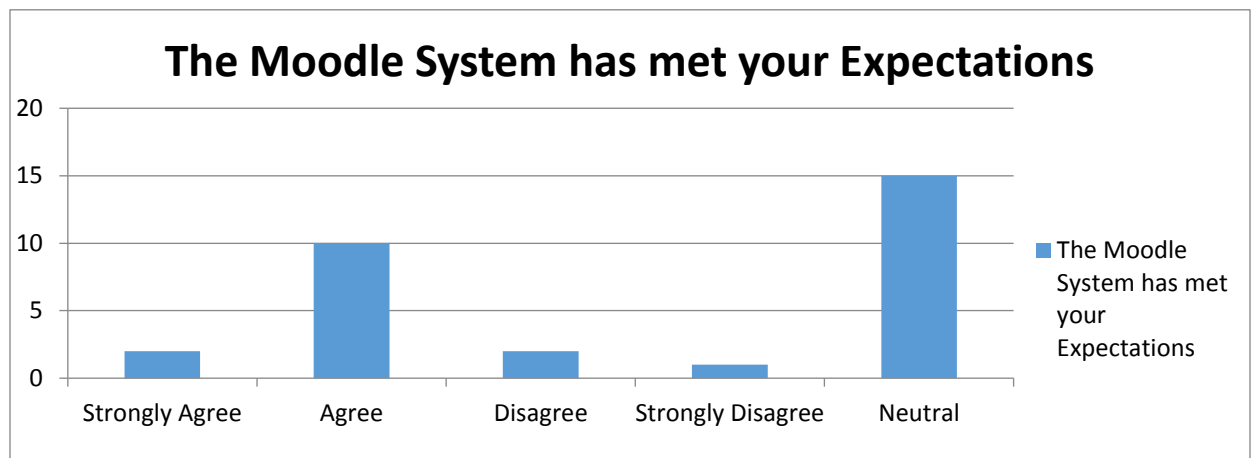
Figure 9. Moodle System meets Users Expectations

Figure 9 represents whether the Moodle system met the expectations of the individuals using it. Out of the target population, 15 were neutral being the highest and 10 individuals agreed to be the second highest. Additionally, 2 individuals strongly agreed, 2 disagreed and 1 individual strongly disagreed. Out of the 15 individuals that were neutral, 5 were from the FST department, 4 from the FNAHSW, 4 from the FEA and 2 from the FMSS department while the one individual that strongly disagreed was from the FMSS. This means that half of the sample are not sure if the Moodle system has met their expectations.

Use

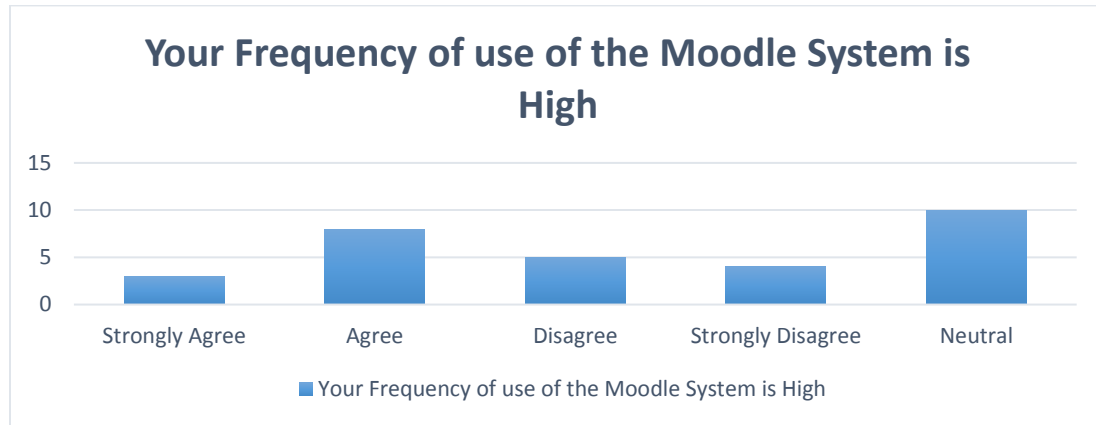**Your Frequency of use of the Moodle System is High**

Figure 10. The frequency of use of the Moodle System is high

Figure 10 displays the frequency use of the Moodle system by the users of it. 10 individuals were neutral, 8 individuals agreed that the frequency of their use of the Moodle System is high and 3 said that they strongly agreed. In addition, 5 individuals disagreed and 4 individuals strongly disagreed that their use was not high. Out of the 10 individuals, it can be said that 3 individuals for the FEA, FST and the FNASHSW were neutral while 1 individual from the FMSS was neutral. This means that the users are not sure if their frequency of the use is high. Some users only use the Moodle system when teachers ask them to, other than that they don't

Knowledge Necessary to use the Moodle System
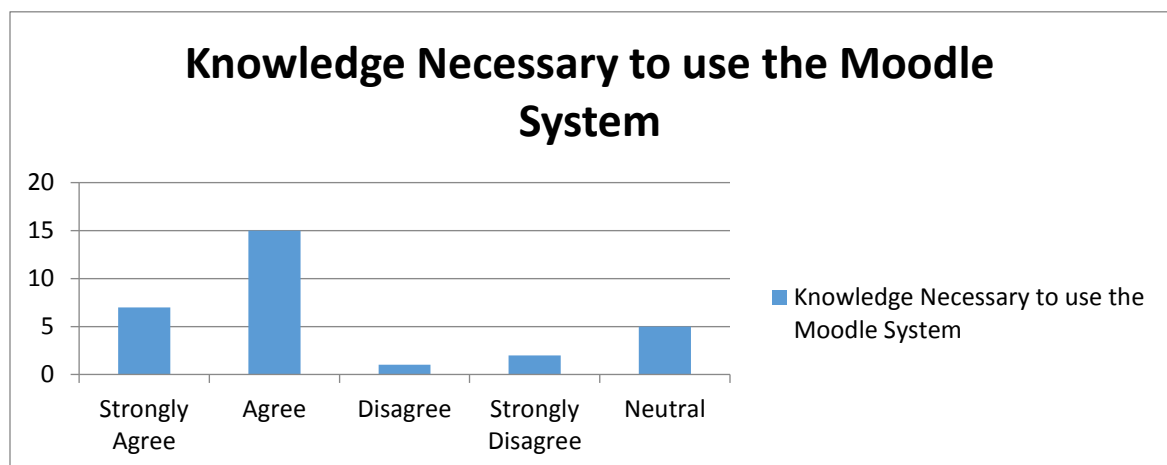
Figure 11. Individuals have the knowledge necessary to use the Moodle System

Figure 11 shows whether these users have the knowledge that is necessary to use the Moodle System. As shown, 15 individuals agreed that they have the knowledge necessary to use the system, 7 individuals being the second highest strongly agreed, 5 were neutral, 1 disagreed and 2 strongly disagreed. It can be said that out of the 15 individuals, 6 were from the FEA department, 5 were from the FMSS, 3 from FST and 1 from the FNAHSW department were the ones who agreed that they have the knowledge necessary to use the Moodle System. This means that half of the sample population have the necessary knowledge to use the system.
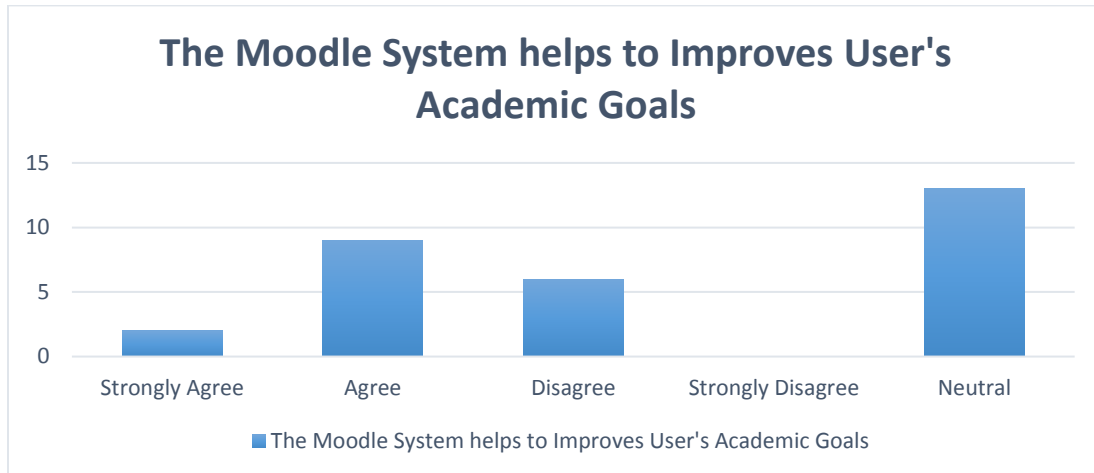
Perceived Net Benefits

Figure 12. The Moodle System helps to improve User's Academic Goal

Figure 12 Illustrates whether the Moodle System of the University of Belize helps Users to improve their Academic Goals. Again, the highest being neutral was 13 individuals, 9 individuals agreeing and 2 individuals strongly agreeing. However, 6 individuals disagreed and no one strongly disagreed. This indicates that nearly half of the sample population is not sure whether the Moodle System enhances their academic goal. This can be maybe because some individuals only access Moodle when requested by the teacher.
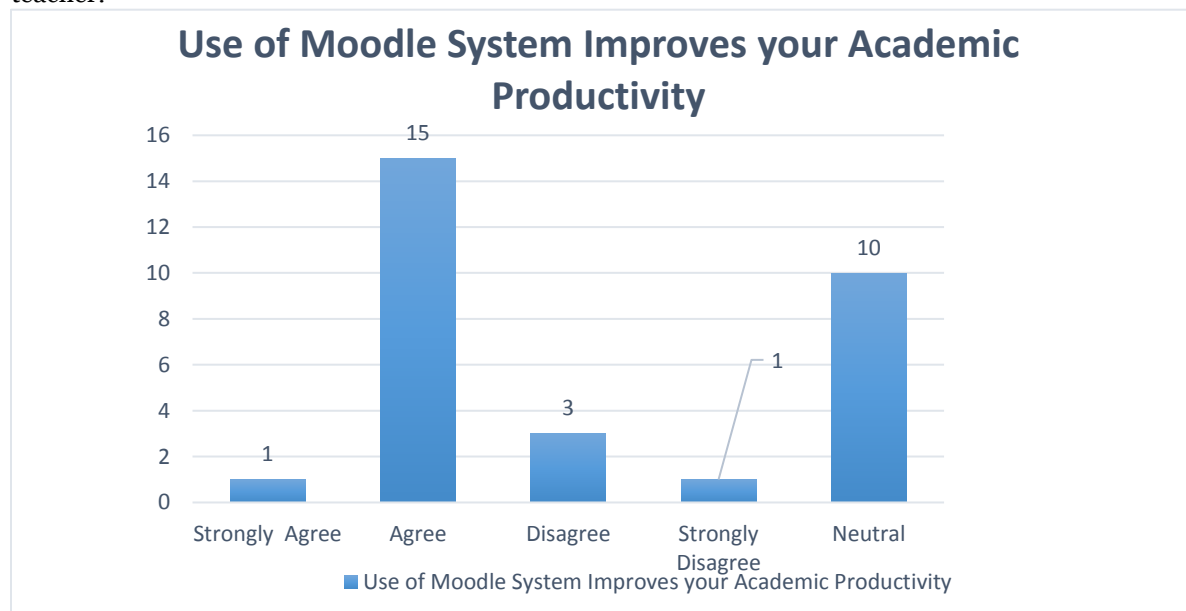
Figure 13. The Moodle System Improves Academic Performance

Figure 13 displays whether the Moodle System improves the academic performance of the users. 50 % (15) being the highest and half of our sample fully agreed that this system improves their academic performance. 34% (10) were neutral, 10% (3) disagreed, 3% (1) strongly disagreed and 3% (1) strongly agreed. Out of the 15 individuals (50%), 6 were from the FEA department, 5 from FMSS, 4 from the FST and 1 from the FNAHSW department. This indicates that half of the sample population agrees that the Moodle System enhances their academic productivity and performance.
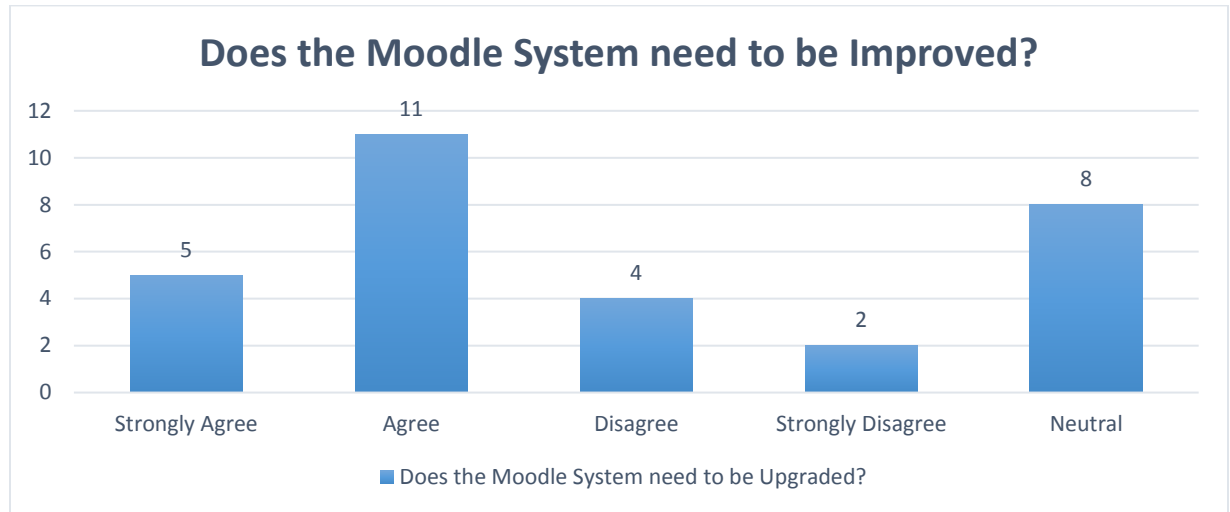
Does the Moodle System need to be Improved?

Does the Moodle System need to be Upgraded?

Figure 14 Moodle System needs to be improved

Figure 14 illustrates whether the Moodle System needs to be improved. 36% (11) agreed that the system should be improved, 27% (8) were neutral which the second is highest. Moreover, 17% (5) strongly agreed that it should be improved while 13% (4) disagreed and 7% (2) strongly disagreed. This signifies that most of the sample population agree that the Moodle System needs to be improved. It also represents that many discrepancies may exist that can hinder or be a bias towards the Information System of the University of Belize.

Discussion

Regarding the Moodle System Information Quality, most students were neutral in regards to the significance of the information provided on the platform. This may result from most classes not utilizing the platform. Furthermore, in relation to system quality, students agreed that the Moodle's system quality is successful in regards to its high-speed access and loading pages and images.

The Service Quality aspect of the Delone and Mclean Model resulted in high neutral responses. As stated before, this can be a result of most staff not utilizing the platform. In addition, User Satisfaction also generated a neutral response. This signifies that individuals were impartial in their responses. This may be a result of low usage of the Moodle System.

As it relates to the usage of Moodle, students are once again neutral when asked about how frequently they utilize the Moodle System while agreeing to have the knowledge necessary to use the platform. This signifies that students know how to use the platform but are not required to. On the other hand, the Perceived Net Benefit aspect resulted in students agreeing that the Moodle System improves their academic productivity. However, most students were neutral when asked if the system helps to improve their academic goals. Overall, most students agree that the system can be improved.

Conclusion

For this research, investigators utilized the DeLone & McLean IS Success Model. Where, this model has various components such as System Quality', 'Information Quality', 'Use', 'User Satisfaction', 'Individual Impact,' and 'Organisational Impact'. The system quality aspect of this model seemed very favorable where many students were satisfied with the system loading pages and images, as well as the system providing high-speed internet access. Similarly, the Information Quality section of this model, which entails providing information that they need as well as the information being significant to their classes, derived a more neutral response.

The Service Quality section, which entails whether the staff keeps the system updated and whether staff responds promptly to issue with the system derived neutral responses as well. On the other hand, User Satisfaction also generated favorable responses as it relates to question such as having a positive attitude

towards Moodle and whether the system has met the user's expectation. The Use aspect of the DeLone & McLean IS Success Model also generated appropriate responses as it relates to question such as the frequency of using the system, as well as whether the user has the knowledge to use the System. Finally, the Perceived Net Benefit section, which entails questions such as improving user's academic goals, and productivity, generated both neutral and favorable responses.

Limitations

There were various limitations that researchers faced while conducting this research. Firstly, most students did not want to answer the questionnaire due to its length, which caused haste. Additionally, the sample size was limited. Where, the researchers only generate responses from 30 individuals, which can lead to data misrepresentation. Additionally, the staff was not part of the respondents. Furthermore, this research study focuses only on the Belmopan Central Campus. Hence, excluding students from, Punta Gorda, Belize City, and Central Farm campuses. Where this study limits the number of perspectives that can be gained from students located on the other campuses. Furthermore, the research study focuses only on students enrolled for the current semester the research is being conducted which 2019-1. Hence, these limitations decrease the sample size and survey population significantly which in return increases the possibility of errors affecting the ability to generalize about the entire population.

Recommendation

Based on the results of this research it is evident that many students of the University of Belize were very neutral and not sure about what their opinions were as it relates to the Moodle System. Therefore, it is recommended that students be educated on the different advantages and disadvantages of the system in order for the students to have a better understanding of the system to decipher whether the system is actually benefiting them. This recommendation can surely benefit the University because it will provide faculty members with better feedback as it relates to the Moodle system.

Additionally, it is also recommended that the University of Belize staff would update their Moodle system in order for students to have timely and efficient information on the system. Also, we recommend that further research be done with a larger sample size to generate a more accurate result on this system to determine whether students are actually benefiting from the use of this information system or not. Furthermore, the University of Belize should take Moodle more seriously and enforce usage in every course.

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Appendix

Questionnaire I – "Success of Moodle" (Student End Users)

We are students of the University of Belize enrolled in a CMPS3012 MIS. This questionnaire is focused on determining Students perspective on the effectiveness of the Moodle system. All surveys are anonymous and therefore the results cannot be connected to any individual.
Your responses to the questionnaire will be strictly confidential and used solely for this research.

Instructions

Please indicate your level of agreement with the following by ticking the option that matches your response.

1. Background Information	Answers:
What is your gender?	Male ☐ Female ☐
What is your age?	16-19 ☐ 20-25 ☐ 25-30 ☐ 31 and Above ☐
What faculty are you in?	FMSS ☐ FEA ☐ FST ☐ FNAHSW ☐
What degree are you pursuing?	Bachelors ☐ Masters ☐ Associates ☐

Strongly agree=5   Agree=4   Neutral=3   Disagree=2   Strongly disagree=1

2. Information Quality						
Does Moodle provide information that you need?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Does Moodle provide information that is significant to your class?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Does Moodle provide sufficient information?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Does Moodle provide information that is easy to understand?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Does Moodle system provide up-to-date information?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
3. System Quality						
Is the Moodle system user-friendly?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Does the Moodle system provides interactive features between users and the system	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Are you satisfied with how quickly the Moodle system portal loads pages and images	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Does the information system provide high-speed information access?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
Is the organization of the information on the system screen clear?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	
5. Service Quality						

Does the support staff keep the Moodle system software up to date?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Does the Moodle system support staff respond promptly when users? have a problem?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
6. User Satisfaction					
Most of the users have a positive attitude of Moodle.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
The Moodle system has met your expectations.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
7. Use					
Your frequency of use of the Moodle system is high	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
You depend upon the Moodle system	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
You were able to complete a task using Moodle even when there was no one around to tell you what to do	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
You have the knowledge necessary to use the Moodle system	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Does the Moodle system allow you to quickly complete your work?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Does the Moodle system allow you to recover easily after a mistake is made?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
8. Perceived Net Benefits					
The Moodle system helps you improve your academic performance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
The Moodle system helps you achieve your academic goals	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Using the Moodle system improves assessment and teaching	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Using the Moodle system at school increases your academic productivity	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Overall, using Moodle enhances student performance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Technological and Infrastructural Issue					
The Moodle system is very slow and needs to be improved?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Thank you for your participation.