

Moodle Management Systems Success at the University of Belize (Belize City Campuses)

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Abstract

Delone & Mclean model has been used to conduct a substantial amount of research regarding Information success systems. The Delone and Mclean IS Model includes the following six dimensions: Information quality, system quality, service quality, use, user quality and perceived net benefits. Even though the Delone and Mclean IS Model is a widely used model, a small amount of research has been conducted in developing countries such as Belize. This study provides an empirical test with modifications to the IS model consisting of complementary technology quality and self- efficacy as constructs. This research paper focuses on the eight altered dimensions in order to ~~prove~~ ascertain the success of the Moodle system at the University of Belize ~~is~~. Moodle is a free learning platform originally designed by Martin Dougiamas with the objective to help educators communicate and interact with students online. While there are many information systems around the world and continuous research has been conducted on them, this research shows that the success rate of the Moodle systems at the University of Belize is minimal.

Keywords: Information Systems Success Model, Moodle Information System, University of Belize, Developing countries, Belize.

Introduction

The use of communication and technology together has resulted in an increase in investment to aid in school's business functions. The use of the Moodle e-learning information systems as a means of communication between lecturers and students is also increasing in recent years. In order to assess these forms of communication and learning technology, Delone and Mclean recreated an Information Systems Success Model to assess Information Systems success. This includes the following six success dimensions: information quality, system quality, system quality, use, user satisfactions and perceived net benefits (Delone and Mclean 2003).

There are many e-learning information systems around the world. 68 million users are utilizing the Moodle e-learning information systems with the inclusion of the University of Belize. Moodle e-learning Information System was created by Martin Dougiamas in 2002. While creating Moodle, Dougiamas aimed to assist teachers/ lecturers with the tools to communicate and provide online education courses digitally in an efficient and effective manner. To supplement classroom lecturing, Moodle e-learning Management Systems was made available to implement distance learning by providing the right educational tools. (ComSpec, International, 2015).

Research on the Moodle e-learning Information Systems has been performed by many of the University of Belize students over the years. To revisit previous research on the success of Moodle Information Systems, this research topic aims to provide current data analysis on the success of Moodle through empirical research on this topic. Researchers like Delone and Mclean performed a ten year update on the success of IS Model by combining research previously done on IS Model success and create a database for reference for future researchers (2003).

The structure of this research paper is as follows, a literature review of past research on information success and Moodle. Secondly, the methodology will be reported with a twelve (12) point Hypotheses which will be proposed, and the last section of this paper consists of the results of this research, the conclusion and recommendations.

Literature Review

The emergence of technology has been seen as early as 1950's according to researcher Reiser (1987) in academic learning use of computers and technology. In recent years, Learning Management Systems has seen an increase in implementation acts as a complement to face to face learning (Coates, James & Baldwin, 2005). According to Szabo and Flesher 2002, Learning Management Systems can be defined as a structure with instructional tools that encompasses organizing academic information, assessing users' goals, collecting data and creating progressive reports for management supervision.

In order to assess a learning Management System certain criteria should be recognized. Delone and McLean IS Success Model is an essential means for testing the success of information systems and understanding how valuable they can be. Even though some universities are utilizing these E- learning systems as a tool for effective learning, substantial researches should be conducted to test the overall effectiveness of these systems.

Moodle (e- learning) system is a free open course management system for online learning (Martin Dougiamas 2006). Moodle is currently being used by the University of Belize educators and students. This research was carried out in order to review the effectiveness and success of UB's Moodle (E-learning) system. The Delone and Mclean model is one of the most widely cited Information success models (Heo & Han 2003). It suggests that a systematic combination of individual measures of Information success can create a complete measurement instrument.

Belize is considered as a developing country. For this paper, the researchers made adjustments to the traditional model. Due to such consideration, it was concluded that Belize simply lacks the needed complementary assets to truly achieve IS Success. Organizations in Belize have invested substantially in information systems and programs, but these systems have failed to provide optimal success due to the country's poor investment in complementary assets needed to run any system. (Delone & McLean, 2003)

Due to the fact that the University of Belize is a not for -profit governmental institution, it receives partial funding from the Government of Belize. Since Moodle (E-learning) systems are free, it assists the university with cost savings. E-learning effectiveness evaluation highlights good or bad practice, detects errors and rectifies mistakes, assess risk, enables optimum investment to be achieved, and allows individuals and organizations to learn (Roffe, 2002).

In order for E-learning environments to be effective there should be a high-level of communication that allows users to share information and decide how to retrieve this valuable information. It is necessary to understand the targeted population/ group when developing E- learning systems. First, learner characteristics, such as self-efficacy, self-directed behaviour, and autonomy need to be identified (Passerini & Granger, 2000). Moodle (E-learning) system enables educational functions into an electronic form and provides courses via information technology and Internet. E-learning is currently a growing educational and training tool due to its cost saving advantages, institution reusability, and user flexibility.

Other researchers have contributed to body of research on knowledge management systems success. Because of the convenience of having a wireless technology system, many users were obliged to use the wireless knowledge management systems for the retrieval of information (Wong & Hiew, 2005). Moodle is a system that can be accessed from wireless technology for the retrieval of information. Many lecturers at the University of Belize use the Moodle systems as means of sending vital information to the students

for class sessions. Research has also revealed that many knowledge management systems were significantly lower in education than from a business point of view (Allce.1997; Alavi & Leidner, 2001).

However, this has changed in recent years, researchers such as Chen and Huang 2010 and Guo and Wong 2015 and many others has shown that there is an increased interest in knowing the success and also give recommendations on the findings in their research. To understand how to determine the success of the health information systems Heeks (2015) states that there are several ways; first being able to assess the total failures, second to assess partial failures and finally the initiative the shareholders use to obtain goals that are of most significance to them.

There is a disparity between Developing Countries and Countries who are well developed when it comes to the availability of resources and the inability of developing countries to combine computer systems technology and efficient internet speed which will facilitate optimal use (Kiesler, 1992). Moreover, according to Lutz (2003) systematic approach to the implementation of Information and Communication Technologies (ICT) is lacking. With ICTs, people in developing countries are not equipped to operate a basic ICT model (Sife, Lwoga and Sanga (2007).

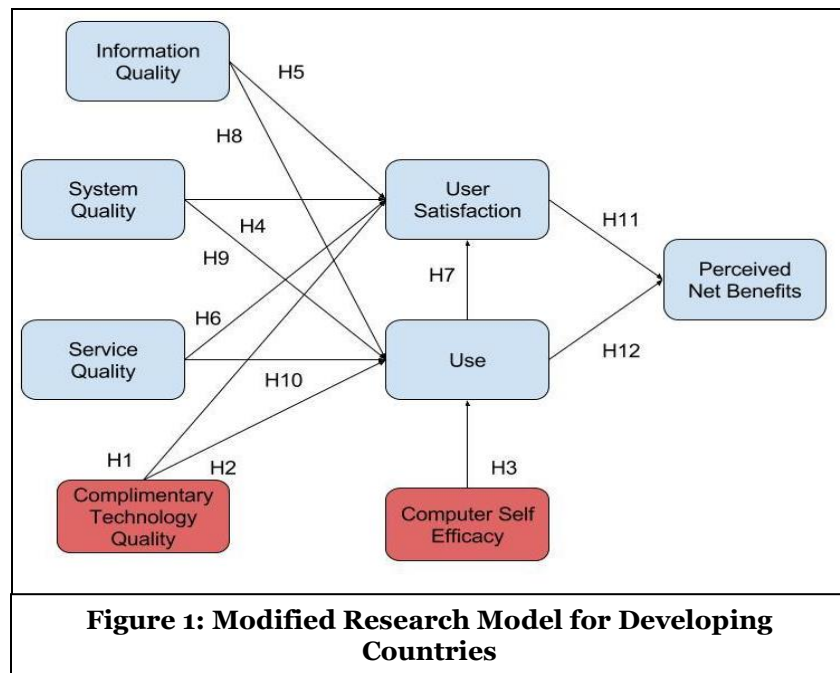
Methodology

The purpose of Moodle as an online platform is to facilitate communication between the lecturers and students as it relates to online class activities. Some of the primary features of Moodle are the ability for users to access their grades online and perform tests and quizzes online. To evaluate the effectiveness of Moodle information systems questionnaires were issued to sixty students from the University of Belize, Belize City Campus using Delone and McClean Information Systems Success model. The Delone and McClean IS success model was first introduced in 1992 and the 10 year update was published in 2003. Research from Delone and McClean revealed that a research model must be updated as time passes and with the improvements in technology.

Using D & M- IS Model as a guide this research was an empirical study on Moodle's information quality, system quality, service quality, use, user satisfaction, and perceived net benefit. Two other characteristics were introduced to complement D & M IS model success. They are complementary technology and self-efficacy. According to research from McKinney et al, when assessing an information technology success; one must consider the following functionality, usability, performance (2002). In a circumstance or event several people may experience an event or circumstance differently (Delone and McClean 2003). This study focused mainly on the perspective of the students and lecturers using the six Information Success dimensions: information quality, system quality, service quality, system use, user satisfaction, and perceived net benefits by Delone and McClean.

Hypothesis:

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



Description of Participants

The University of Belize is the national university of Belize, who is subsidized by the Government of Belize. Being the premier university of the country, the university has an estimated student count of 4,000 students for all the campus throughout Belize. The study was carried out within the Faculty of Management and Social sciences .The target group consisted of participants enrolled in the following courses: Quantitative Methods (Math), Advance Accounting, and Management information systems.

Sample size of data Collection

The sample size for this research consisted of sixty students from the faculty of Management and Social sciences. Forty out of sixty questionnaires were retrieved. The research team used convenient sampling as distribution tool for the questionnaires.

Table 1. Characteristics of the respondents- Students (End users)		
Gender	Number	Percentage
Male	23	57.50%
Female	17	42.50%
Age		
1 - Less Than 25	18	47.37%
2 - From 25 to 35	16	42.11%
3 - Over 35 to 45	4	10.53%
4 - Over 45 to 55	0	0%
5 - Older than 55	0	0%

Education		
1 - 1st year	2	5%
2 - 2nd year	22	55%
3 - 3rd year	14	35%
4 - 4th year	2	5%
Working Experience		
1- <5	12	30%
2 - 5-10	17	42.5%
3- 11-15 years	9	22.5%
4- >15 years	2	5%

Construct Measurement

The validity and reliability is essential when doing research. The measurement scales used were qualitative and quantitative data collection are as follows: Complementary Technology by Teece D. J. (1988), Computer self-efficacy measurement from Compeau, D. R., & Higgins, C. A. (1995) and the eight (8) constructs from Bailey and Person (1983), modifications ~~was~~ were made to the context of Moodle e-learning information system. All the items were measured using a 7 point Likert Scale with anchors ranging from strongly agree (7) to strongly disagree (1). As seen below.

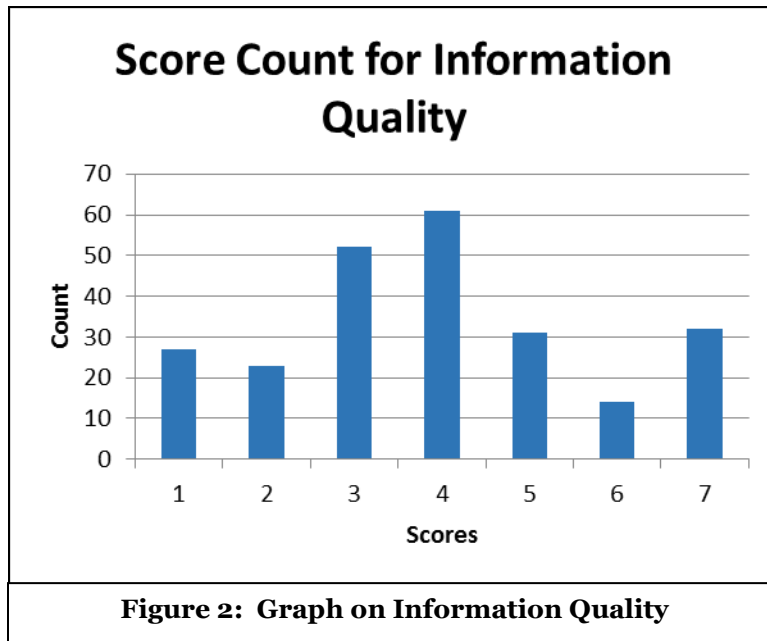
Construct	Survey questions	Source
Complementary Technology	<p>CTQ1: The software on the device (desktop computer, laptop, mobile device) used to access the Moodle is adequate.</p> <p>CTQ2: The device hardware (desktop computer, laptop, mobile device) used to access the Moodle is adequate.</p> <p>CTQ3: The speed of the Internet connection used to access the Moodle is adequate.</p> <p>CTQ4: The reliability of the Internet connection used to access the Moodle is adequate.</p>	Teece, D. J. (1988)
Computer Self-Efficacy Measures	<p>CSE-1 : if there was no one around to tell me what to do as I go.</p> <p>CSE-2 : if I had never used an information system like it before.</p> <p>CSE-3 : if I had only the information system manuals for reference.</p> <p>CSE-4 : if I had seen someone else using the information system before trying it myself.</p> <p>CSE-5: if I could call someone for help if I got stuck.</p> <p>CSE-6 : if someone else had helped me get started.</p> <p>CSE-7 : if I had a lot of time to complete the job for which the</p>	Compeau, D. R., & Higgins, C. A. (1995).

	<p>information system was provided.</p> <p>CSE-8 : if I had just the built-in help facility for assistance.</p> <p>CSE-9 : if someone showed me how to do it first.</p> <p>CSE-10 : if I had used similar information systems before this one to do the same job.</p>	
Information quality	<p>IQ1: The Moodle system provides information that is exactly what you need</p> <p>IQ2: The Moodle system provides information you need at the right time</p> <p>IQ3: The Moodle system provide information that is relevant to your job</p> <p>IQ4: The Moodle system provides sufficient information</p> <p>IQ5: The Moodle system provides information that is easy to understand</p> <p>IQ6: The Moodle system provides up-to-date Information</p> <p>IQ7: The Moodle system provides sufficient information</p>	Bailey and Person (1983)
System quality	<p>SQ1: The Moodle system is easy to use. SQ2: The Moodle system is user friendly.</p> <p>SQ3: The Moodle system provides high-speed information access.</p> <p>SQ4: The Moodle system provides interactive features between users and system.</p>	Alshibly, (2011)
Service quality	<p>SV1: When users have a problem, The Moodle shows a sincere interest in solving it.</p> <p>SV2: The Moodle insists on error-free records.</p> <p>SV3: The Moodle tells users exactly when services will be performed.</p> <p>SV4: You feel safe in your transactions with the e-HRM. SV5: The Moodle gives users individual attention.</p>	Chang et al., (2009)
User satisfaction	<p>US1: Most of the users bring a positive attitude or evaluation towards the Moodle system function.</p> <p>US2: You think that the perceived utility about Moodle is high.</p> <p>US3: The Moodle has met your expectations.</p> <p>US4: You are satisfied with the Moodle system.</p>	Seddon and Yip (1992)
Use	<p>U1: The frequency of use with the Moodle system is high. U2: You depend upon the Moodle system.</p> <p>U3: I was able to complete a task using the Moodle even if there was no one around to tell me what to do as I go.</p> <p>U4: I have the knowledge necessary to use the e-HRM.</p>	Balaban et al., (2013) Rai et al., (2002).

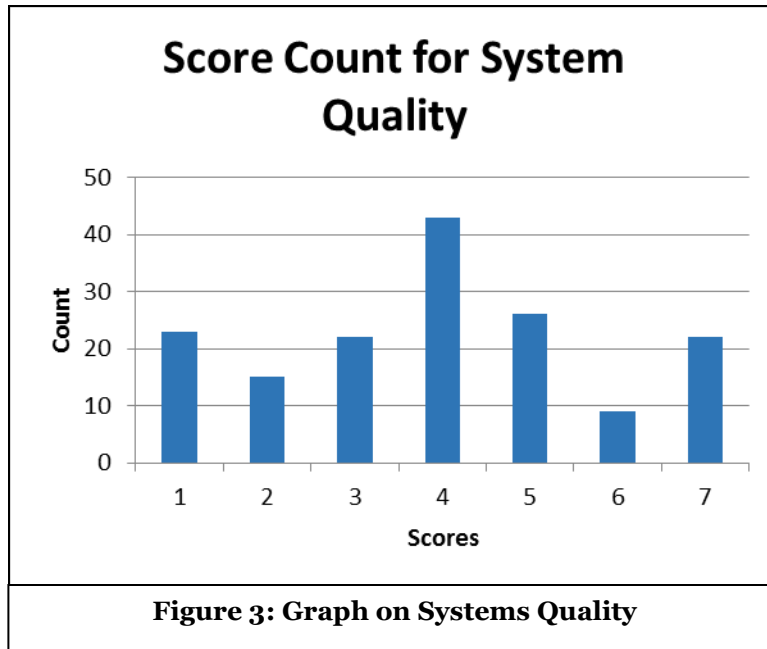
Perceived net benefits	NB1: The Moodle system helps you improve your job performance. NB2: The Moodle system helps the organization save cost. NB3: The Moodle system helps the organization achieve its goal. NB4: Using The Moodle improves the assessment and training	Alshibly,(2011); Tansley et al, (2001)
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Presentation of Data

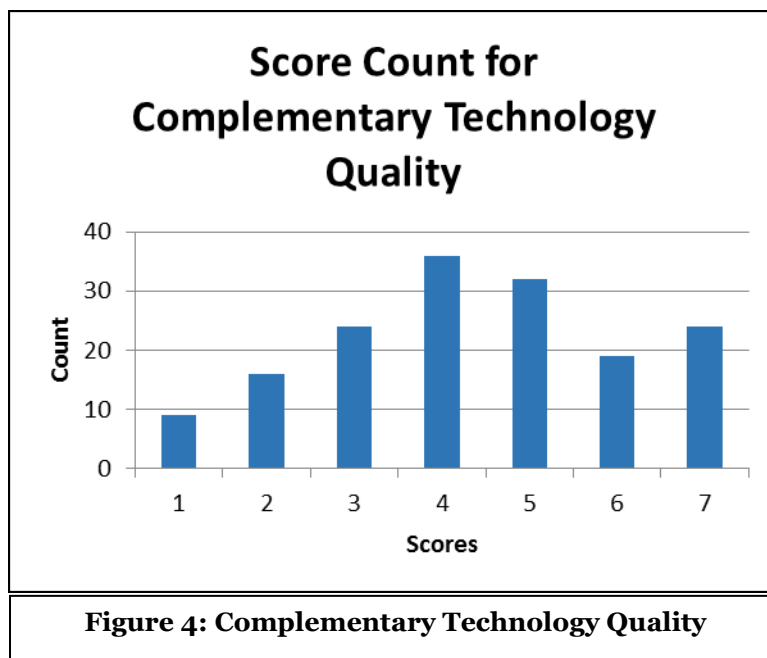
The primary purpose of the study was to see the usage and success of Moodle Information System at the University of Belize. Four Complementary Technology (Teece,1988) also with Computer Self-Efficacy Measures by Compeau, D. R., & Higgins, C. A. (1995) were distributed to students of the University of Belize and the results of the issued questionnaires were displayed through the use of Bar Charts.



Based on the graph above, it is evident that the service quality of Moodle is lacking to a large extent. The majority of respondents are in agreement that Moodle's service quality needs improvement and only a few users agree that its overall use satisfies their needs as an online communication tool. The major deficiency identified by users was that the technical support does not update Moodle and they do not solve technical issues for users.



Most users agree that the system quality of Moodle is average. Users also agree that Moodle lacks interactive features. Moreover, users disagree with Moodle being user-friendly and are dissatisfied with the overall design of Moodle.



The score count for the complementary technology quality has a wide variance, however most users agree that the quality is average. Users agree that the complementary technology needs improvement especially in areas such as reliability and speed in accessing Moodle.

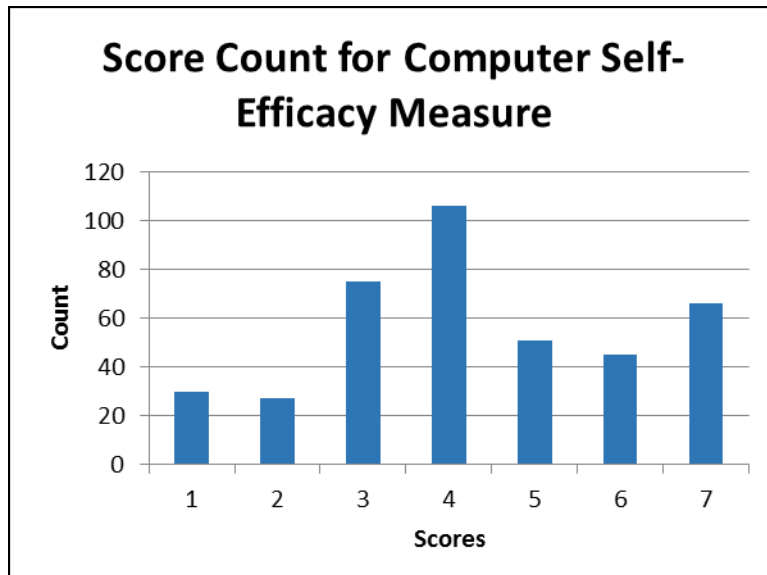


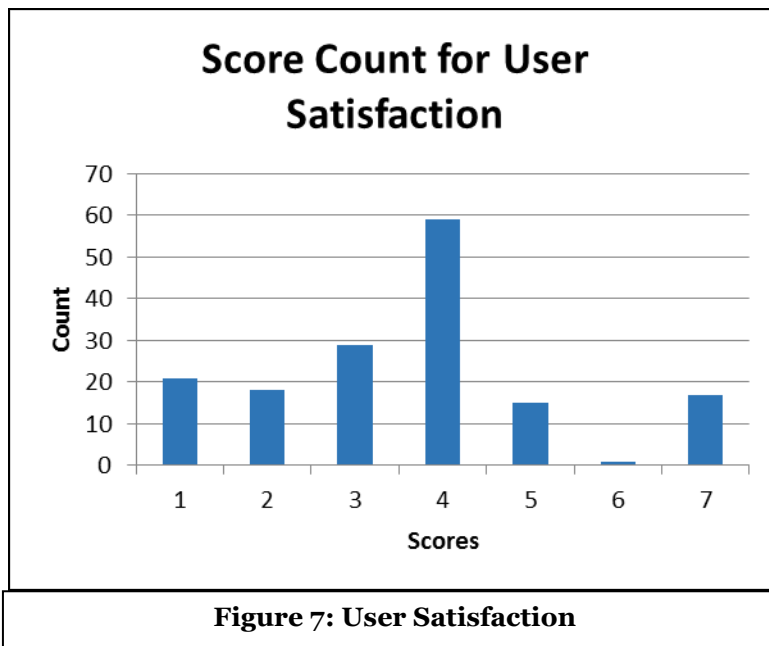
Figure 5: Computer Self- Efficacy Measurement

Users agree that if they need assistance with Moodle, they were able to seek assistance from an accessible support staff. Also, users believe that they would perform better if there were properly trained to use the software from the onset . Overall users agree that Moodle needs to provide support to better assist them.

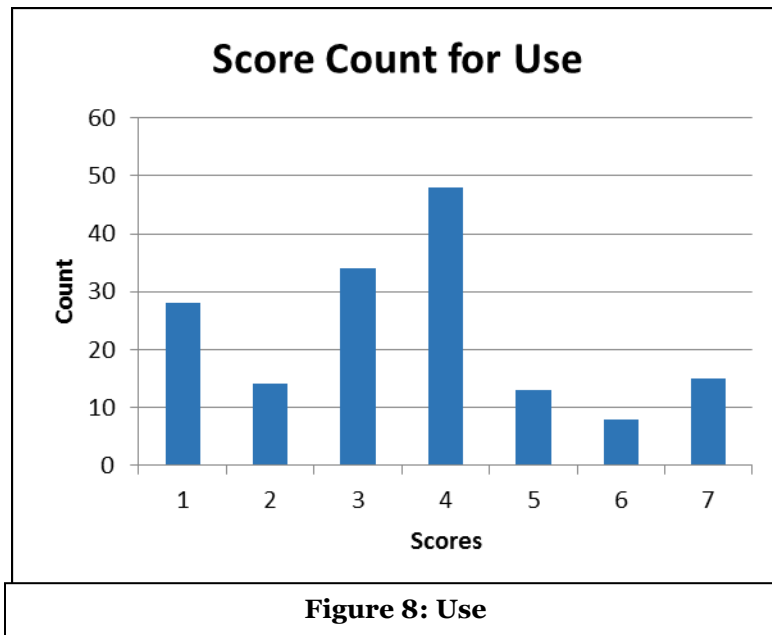


Figure 6: Service Quality

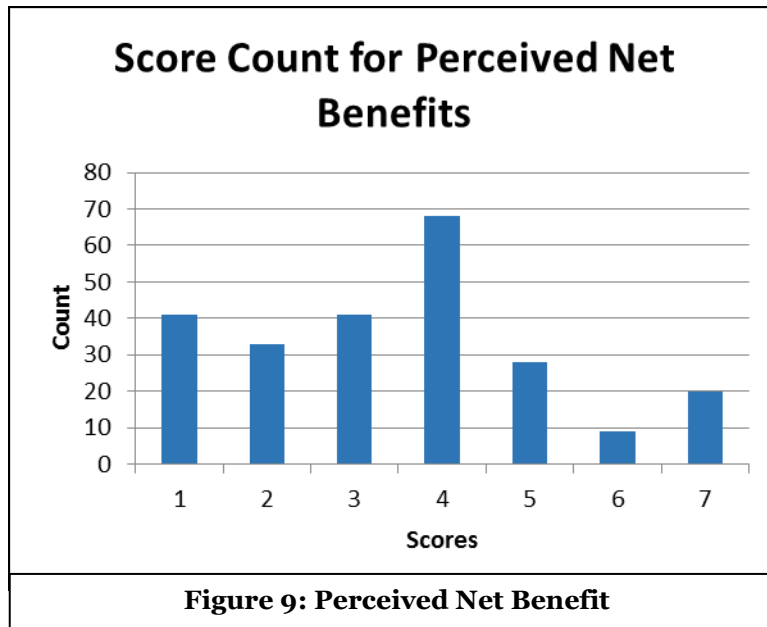
Based on the service quality graph, it is evident that Moodle lacks service quality. The majority of users agree that Moodle's service quality needs improvement and only a few users agree that it's excellent.



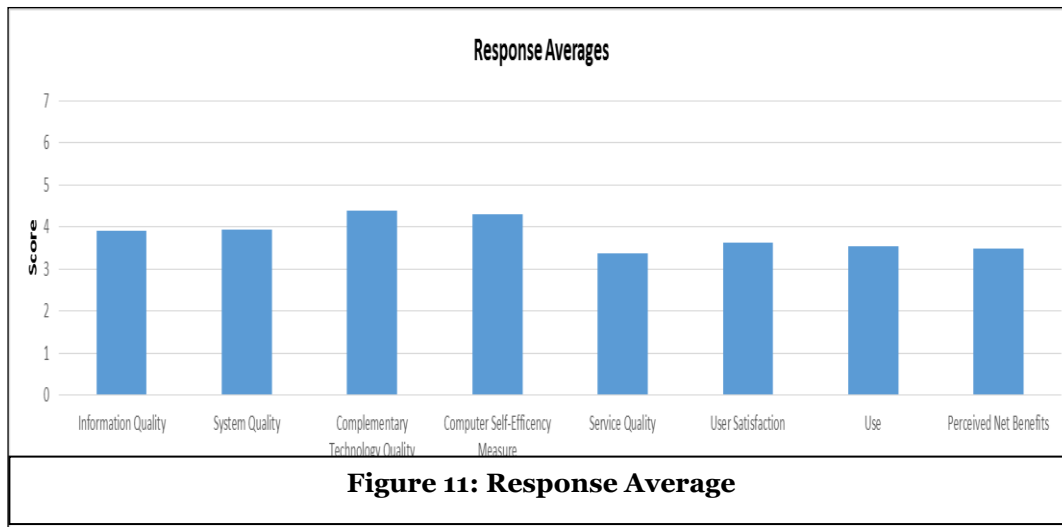
The satisfaction rate with Moodle is very low. The majority of respondents revealed that Moodle did not meet their expectations and only a few are satisfied with using Moodle.



The chart above displays a very low usage of Moodle. In addition, the majority of respondents disagree that they have a high dependency for Moodle. Also users seem to be able to complete their tasks for Moodle without assistance.



Respondents disagree that Moodle helps the organization achieves its goal. However, there is a mix of users that agree and disagree that Moodle has helped with academic performance as well as helping UB to be efficient and effective. Only a few respondents agree that Moodle has assisted them in increasing their academic productivity.



Conclusion

Discussion and Analysis

We have assessed how successful a Learning Management Systems is based on various factors, which Delone and McLean stated in their 2003 update of Information System Success Model. Another factor mentioned Baker et al (1994) it is important to integrate computer systems with the aspect of Learning. In the assessment of Moodle-Student responses, the results regarding the eleven constructs were consistently above average with a score between 3.55 and 4.36. Empirical studies have shown that since complementary technology quality was also above average as shown in Figure 12, the successful provision of this system quality to students was little below four which states that the systems quality was well above average. In retrospect, the finding for system quality has seen an increase from past researches done on the Moodle Information System at the University of Belize. The dependent variable of perceived net benefits as shown above in Figure 11 is above average; in past research this number was significantly low, which resulted from the minimal use and user dissatisfaction of the Moodle System in the past.

In conclusion, the average responses for all categories are in agreement with Moodle in terms of quality, user interaction, and overall benefits. The scores were poor with an estimated total score of 3.48 only. The scores reflect that users of Moodle are generally not satisfied with the service, with a few users being the exception. The majority of the respondents agree that the service quality is Moodle's weakest characteristic, while the complementary technology of Moodle is its strongest aspect although not by a significant margin.

Implications

Empirical evidence generated from applied research has shown that in the determining success using the Delone and McLean model of IS Success, Moodle Information Systems has been improving over the years since introduction at The University of Belize. In this research, the six constructs of the model were tested along with modifications of a seventh and eight construct in efforts to understand system success in developing countries.

Studies from this research have shown that the inclusion of the seventh construct provided results of interest to developing countries that are unable to effectively receive optimal success from the integration of information systems. Complementary technology quality was evident average based on the research results

When assessing the technological frameworks for the Moodle Information System, the complementary technology quality was average. Empirical Research has shown that Belize simply lacks the adequate

technological resources to reap optimal success of any information system. But, according to the survey this has changed and shows that an improvement was made to complementary technology.

In order to effectively manage the Moodle Information System collaboration between the people who uses the system, the technology to access the system and the easy accessibility of help when needed must be satisfied.

Limitations and Future Research

Given the time constraint of one semester to complete a research paper the researchers faced limitations in while conducting the research. The researchers had limited the population of students from the Belize City Campuses. The sample size is too small to give a definite answer on the success of the Moodle Information Systems. A longer time frame for this type of study is recommended that for future studies, in order to have adequate time to collect and analyze a larger sample size.

Due to the sample size of this study being relatively small compare to the size of the University of Belize, this study findings can't be generalized to the all the campuses of the University of Belize. More research on this topic is needed to receive a definitive answer of how successful Moodle Information Systems is.

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