Evaluating the Success of Moodle: The Learning Management System at Independence Junior College

Tania Cruz
University of Belize
Humming Bird Avenue, Belmopan
2018118428@ubstudents.edu.bz

Karen Arriola
University of Belize
Humming Bird Avenue, Belmopan
2014110199@ubstudents.edu.bz

Darwin Tzot
University of Belize
Humming Bird Avenue, Belmopan
2016114951@ubstudents.edu.bz

Aaron Hernandez
University of Belize
Humming Bird Avenue, Belmopan
2018219510@ubstudents.edu.bz

Abstract

Moodle is a well-known learning platform that enhances students' online learning success. The software has been installed at Independence Junior College (IJC) to add value to the institution. This study utilizes DeLone & McLean Information Success Model as an instrument to evaluate the success of Moodle at Independence Junior College. This model includes the following six dimensions: information quality, system quality, service quality, use, user satisfaction and perceived net benefits. Also, to these existing dimensions, two other constructs were added; computer self-efficacy measure and complementary technology. This research paper is based on eight different dimensions to measure the success of the Moodle system at IJC. Moodle at IJC is a web-based system that is used by both lecturers and students. Students access documents, they take quizzes/tests, they track grade reports for each class and conduct online classes. Questionnaires were distributed among first and second-year student. The results indicated that most students are satisfied with the information system and overall they believe that the Moodle system is moderately successful. However, user satisfaction had a significant effect on this area because they believe that some improvements can still be done to the system to provide better services. Therefore, this research shows that the success rate of the Moodle information system is moderately high because it has proven to be very useful to students as it has improved online learning at ICJ.

Keywords: Information System Success, DeLone & McLean's, Moodle Information System, Independence Junior College (IJC)

Introduction

Management Information System (MIS) is the study of technology, organization and people and the relationship among them (Laudon & Laudon, 2016). In this research, Independence Junior College (IJC) has invested heavily in the use of Moodle system in order to add value to the institution. The use of a learning management system (LMS) has allowed IJC to become more technologically inclined by increasing communication between lecturers and students.

Moodle was developed in 2002 by Martin Dougiamas to help educators create online courses with a focus on interaction and collaborative construction of content (Dougiamas, 2003). Moodle is a free e-learning platform that serves educators and learners not only at Independence Junior College but all around the world. It is the most widely used learning management system in the world and has millions of users including those students and lectures at Independence Junior College. Moodle helps to enhance students learning by providing them with online access to module content, assessment, communication tools, and course activities once enrolled in a course (EdTech Team, 2019). For instance, students can log into Moodle by using their Identification (ID) number and password. Students are then able to view course announcements, registered courses, and documents pertaining to the courses registered.

The main purpose of this research is to measure the success of Moodle at Independence Junior College and find ways in which the system can be improved to increase the perceived net benefits of the students attending IJC. This junior college has been implementing the use of the Moodle for a few years now, as a result, it is vital to determine its value and find out if the system is successful for such an institution. This research can be useful to the management or Board of Directors of the institution since it will provide actual data on the students' perspective of Moodle and alert them on the performance of the system. The Information Technology (IT) team would then be provided with information that can allow them to improve the institution's functions and strategic goals.

This study at Independence Junior College was intended to analyze how successful and efficient this system has been and find ways how it can be improved to help students in their learning journey. The basic research method that was utilized for this study was questionnaires to gather information from the students. Hence, the data collected will be represented using tables, histograms, bar charts, and other formats to display the findings of this research paper. Furthermore, the structure of this study is as follows; a literature review, methodology, hypothesis, data results, conclusion and limitations.

Literature Review

Information systems (IS) are seen to have the capacity to make a significant amount of contribution to the teaching, learning and administration in schools of developing countries. There has been a large amount of investment in the introduction of information and communication technology in areas such as schools, including hardware, software, networking and personnel development. This plan or development will be considered worthwhile if there is evidence that has had a corresponding impact on school performance and efficiency in which it provides a look towards the success of the information system (Condie, Munro, Seagraves & Kenesson, 2007).

DeLone and McLean conducted a research where the two researchers' information system success emphasized six interrelated dimensions of information system success such as: information quality, system quality, service quality, user satisfaction, use and perceived net benefits. For the purpose of this research, two additional dimensions were added, they include: complementary technology quality and computer self-efficacy measure (DeLone and McLean, 2003). These two researchers provided such relevant information to form a body of coherent information and for other upcoming researchers to make further studies on this topic about information systems. As we all know, we are living in the 21st century and in order for growing businesses to achieve the strategic business goal of survival, it is imperative that they wisely invest and train in the usage of their business of information systems. IS also assists organizations to achieve five other strategic goals such as: operational excellence, new products, services and business models, customer and supplier intimacy, improved decision-making and competitive

advantage (Laudon and Laudon, 2016). It is especially for that this is the last reason that organizations choose to invest heavily in Information Systems because it is costly to have such technology.

In the research conducted by Winston Lin and Shao (2000), there was a positive relationship between user participation and system success of IS. It also stated that the participation of the users when being motivated to use the information system more often represented more successful results. ICTs provide great opportunity for universities in developing countries to improve their teaching and learning processes. So far, most of the universities in developing countries possess low level ICT infrastructure such as Local Area Network (LAN), internet, computers, video, audio, CDs and DVDs, and mobile technology facilities that form the basis for the establishment of e-learning; and, it is argued that, universities in developing countries should adopt e-learning technologies to improve teaching and learning processes (Sife, Lwoga & Sanga, 2007).

Another research which was conducted in a developing area which was in the areas of the sub-Saharan Africa in which the information system they implemented to use within their education system provided such results of success, but, although their major disadvantage was the internet bandwidth and the low-levels of technology it still demonstrated positive results towards the success of IS (Mtebe, 2015). On another study, technology characteristics which are system quality and information quality were the major factors affecting the success of the learning management system. Information quality had a better impact compared with system quality. Second, personality characteristic which is readiness for online learning had a very weak impact in the learning management system (Jafari, Salem, Moaddab & Salem, 2015).

The Delone and Mclean research assumes that the relationships within the IS model are stable across different businesses. So, based on their thirteen hypotheses it proved that system quality has an effect within the model and, meanwhile, the user satisfaction does not (DeLone and McLean, 2003). It is recommended to develop a system to be more user-friendly, to add tools and other services for interaction and to make the system attractive with modern look and rich features. They can also motivate the students to use the system showing them that is important, by forcing them to frequently use the system and making the system part of the continuous learning process (Sabherwal, Jeyaraj, & Chowa, 2006).

Based on the research that has been conducted we can derive that IS does have success within other countries which are starting to develop, and, "by studying the interactions along these components of the model, as well as the components themselves, a clearer picture emerges as to what constitutes information systems success" (Pitt, Watson & Bruce, 1995).

Methodology

Independence Junior College uses Moodle, a Learning Management System to provide students with course outlines, online assessments and power point from lecturers, making Moodle a communication and information system a correspondence that fits itself to the latest DeLone and McLean (D&N) Information System (IS) Success Model. DeLone and McLean (2003) argues that internet applications process is applicable to their six success dimensions and their newest version of IS success model. DeLone and McLean embolden other people to keep using their model to determine IS success. DeLone and McLean (2003) latest version of IS success model can be adjusted to the measurement challenges of a replacement Moodle context. Consequently, this research propounds a comprehensive model of Moodle success (see figure 1) which indicates that information quality, system quality, service quality, user, user satisfaction, perceived net benefit, self-efficacy, and complementary technology are success variables in Moodle.

We explored D&M IS success model's dimensions' definitions, distinct them with Moodle unique properties, and combined various different perceptions into a revised classification theme. Accordingly, we encompassed the following success dimensions in our theoretical model.

Information quality looks at Moodle's system output quality and its service ability for users. An important factor used when investigating an information system's success is information quality, particularly in web-based systems context (McKinney et al., 2002). System quality includes measures of Moodle as a system itself. It takes into consideration performance characteristics, usability, and functionality among the rest (McKinney et al., 2002). Consequently, system quality can be classified as how easy the system can be

used to perform tasks (Schaupp et al., 2006). Service quality consists of the overall measure of support that is related to Moodle issued by service provider. The success dimension looks at factors like reliability, competence, responsiveness, and empathy of responsible service staff (Pitt et al., 1995).

User satisfaction is the influential attitude to Moodle of a student who directly interacts with the system (Doll and Torkzadeh, 1998). When measuring the overall success of an information system, user satisfaction is one of the most important measures to consider. Use is the measure of the use that students at Independence Junior College give to Moodle. Moodle perceived net benefits include factual benefits adopters obtained from interacting with Moodle. It also includes abundant benefits which encompass measures of the perceived students, and organizational benefits that teachers and students obtain through the use of Moodle. These benefits look at aspects such as efficiency, quality environment, task performance and cost reduction. Complementary technology is also important to take into consideration as it determines how high or low user satisfaction will be. The better complementary technology is the higher user satisfaction will be. Self-efficacy measures the actual use of Moodle by the students and lecturers at Independence Junior College. Self-efficacy and complementary technology are two measures that have been added to the six updated information system success dimensions from DeLone and McLean.

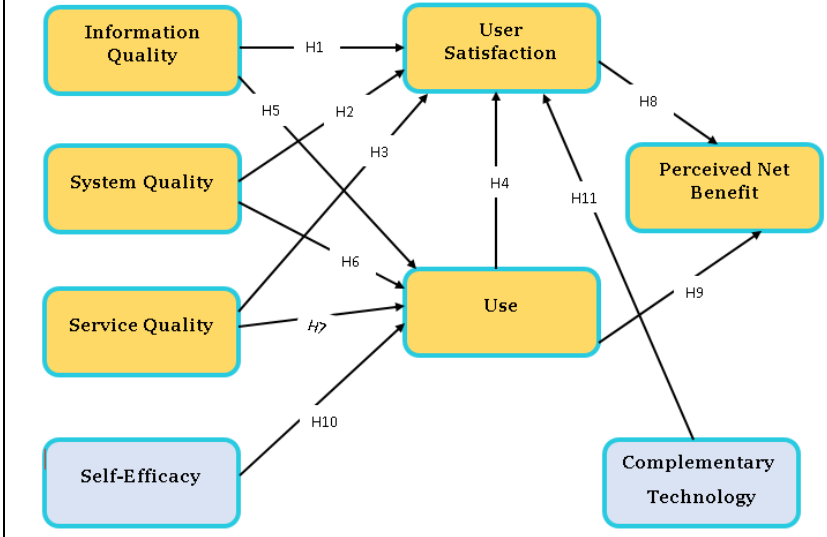

Figure 1. DeLone and McLean Modified Information System Success Model

Hypothesis

H1. Information quality will positively impact user satisfaction.

H2. System quality will positively impact user satisfaction.

H3. Service quality will positively impact user satisfaction.

H4. Use will positively impact user satisfaction.

H5. Information quality will positively impact use.

H6. System quality will positively impact use.

H7. Service quality will positively impact use.

H8. User satisfaction will positively impact perceived net benefit.

H9. Use will positively impact perceived net benefit

H10. Self-efficacy will positively impact use

H11. Complementary technology will positively impact user satisfaction.

Construct Measurement

To guarantee validity of the scales to the content, scale measurements used for the quantitative data collection were obtained mainly from existing verified instruments. Construct of the information quality was measured by a scale which consists of seven items. This scale was done by Baily and Person (1983). With some changes been made to fit the specific context of Moodle, Baily and Person's instrument is accepted worldwide when it comes to measuring Information systems (IS). This has become a standard instrument in the IS field as it has been tested by several researchers for reliability and validity. To measure the system quality construct, a four-item scale was chosen and developed from instruments used by Alshibly (2011). To measure service quality, a five-item scale from instruments used by Chang et al (2009) was adopted and developed. A four-item scale used for previous researches done by Balaman et al., 2013 and Rai et al., 2002 was used to measure Use.

Regarding a specific Moodle experience and the influential attitude to Moodle, this research considers satisfaction as a valuate judgment (Doll and Torkzadeh, 1998). Satisfaction was measured using a four-item scale from Seddon and Yip (1992). Perceived net benefit for Moodle which is defined as an achievement for Independence Junior College for interacting with Moodle as well as an achievement of students related objectives from using Moodle. Perceived net benefit was measured using a six-item scale from (Alshibly, 2011; Tansley et al., 2001). Self-efficacy was measured using a ten- scale instrument from (compeau and Higgins, 1995). Lastly, complementary technology was measured using four- scale instrument adopted from Teecy (1998). All items were measured using a 5- Likert Scale with anchors that range from strongly agree represented by (7) to strongly disagree represented by (1).

According to the feedback that researchers obtained from the reviewers, any question that was confusing or difficult to comprehend were either replaced or not included at all. The constructs and related survey items which were used for measurement are represented in table 1 below.

Construct	Survey questions	Source
Information quality	IQ1: Moodle provides information that is exactly what you need IQ2: Moodle provides information you need at the right time IQ3: Moodle provide information that is relevant to your job IQ4: Moodle provides sufficient information IQ5: Moodle provides information that is easy to understand IQ6: Moodle provides up-to-date Information	Bailey and Person (1983)
System quality	SQ1: Moodle is easy to use. SQ2: Moodle is user-friendly. SQ3: Moodle provides high-speed information access. SQ4: Moodle provides interactive features between users and system.	Alshibly, (2011)

Complementary Technology Quality	CTQ1: The device software on the device (desktop computer, laptop, mobile device) you normally use to access Moodle is adequate. CTQ2: The device hardware (desktop computer, laptop, mobile device) you normally use to access Moodle is adequate. CTQ3: The speed of the Internet connection used to access Moodle is adequate. CTQ4: The reliability of the Internet connection used to access Moodle is adequate.	Teecy (1998)
Computer Self-Efficacy	You can complete a job using Moodle CSE1: if there was no one around to tell you what to do as I go. CSE2: if you had never used an information system like it before. CSE3: if you had the information system manuals for reference. CSE4: if you had seen someone else using the information system before trying it yourself. CSE5: if you could call someone for help if you got stuck. CSE6: if someone else helped you to start. CSE7: if you had a lot of time to complete. CSE8: if you had just the built-in help facility for assistance. CSE9: if someone showed you how to do it first. CSE10: if you had used similar information systems before this one to do the same task.	compeau and Higgins, (1995)
Service quality	SV1: The I.T Department keeps Moodle software up to date. SV2: When users have a problem Moodle support staff shows a sincere interest in solving it. SV3: Moodle support staff respond promptly when students have a problem. SV4: Moodle support staff tells users when services will be performed.	Chang et al., (2009)
User satisfaction	US1: Most students have a positive attitude or evaluation about Moodle. US2: The functions of Moodle are very high. US3: Moodle has met your expectations. US4: You are satisfied with Moodle.	Seddon and Yip (1992)
Use	U1: The frequency of use with Moodle is high. U2: You depend upon Moodle. U3: I was able to complete a task using Moodle even if there was no one around to tell me what to do. U4: I have the knowledge necessary to use Moodle.	Balaban et al., (2013) Rai et al., (2002).
Perceived net benefits	NB1: Moodle helps you improve your educational performance. NB2: Moodle helps students save related costs. NB3: Moodle helps you achieve your academic goals. NB4: Using Moodle at Independence Junior College increases your academic productivity. NB5: Overall, using Moodle enhances your academic performance.	Alshibly,(20 11); Tansley et al, (2001)

Table 1. Measurement Items for Questionnaire

Sampling and data collection

For this research, data were obtained from a sample of students at Independence Junior College. The method used for this research is "purposive sampling" which provides the researcher to use their personal judgment to choose adequate people for the sample.

A total of 30 questionnaires were issued, and all questionnaires were answered, yielding a response rate of 100%, which is considered excellent.

Characteristics of the respondents are presented in Table 2. The dominant gender in this sample was females consisting of 63.3 percent of total sample. 76.7 percent of the students selected were of ages less than 18, and most of these respondents were in their first year of study.

Characteristics	**Number**	**Percentage**
Gender		
Male	11	36.7
Female	19	63.3
Age		
Less Than 18	23	76.7
From 19 to 20	6	20
Over 21 to 22	1	3.3
Over 23 to 24	0	0
Older than 25	0	0
Year of Study		
1st Year	26	86.7
2nd Year	4	13.3

Table 2. Characteristics of the Respondents

Data Analysis and Results

The data was acquired at Independence Junior College. 30 surveys were distributed and 30 were received. Each construct in the survey was coded and analysed using Google Sheets. A 7 point Likert scale was utilized; with questions ranging from strongly disagree to strongly agree. The methodology used in the data results and analysis is applied research. 7 histograms will be presented below along with 1 bar chart comparing all 8 constructs. There was variance among the charts presented below. This results from lecturers not utilizing the information system in some of the programs being offered at the junior college. These charts will help to evaluate the success of Moodle at Independence Junior College.

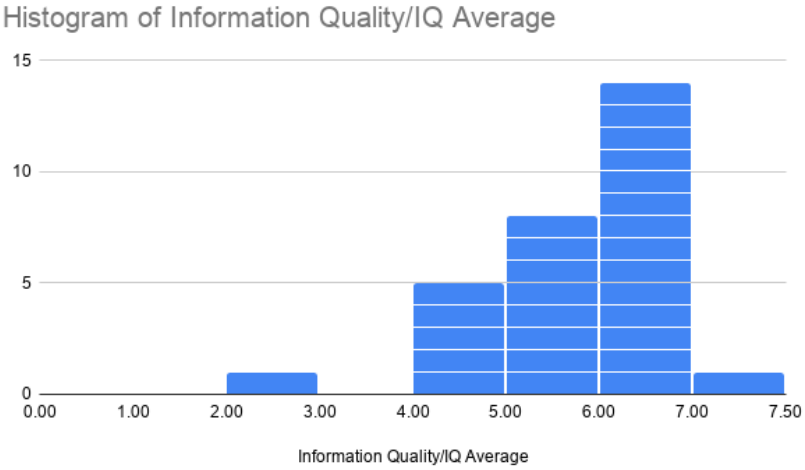

Figure 2. Information Quality

Figure 2 shows the responses for the information quality of Moodle at Independence Junior College. There was variance within this chart. 14 students are satisfied with the information quality of Moodle at the junior college as they rated the information quality from ranges 6 to 7. However, there was 1 student who was not satisfied with the information quality of Moodle.

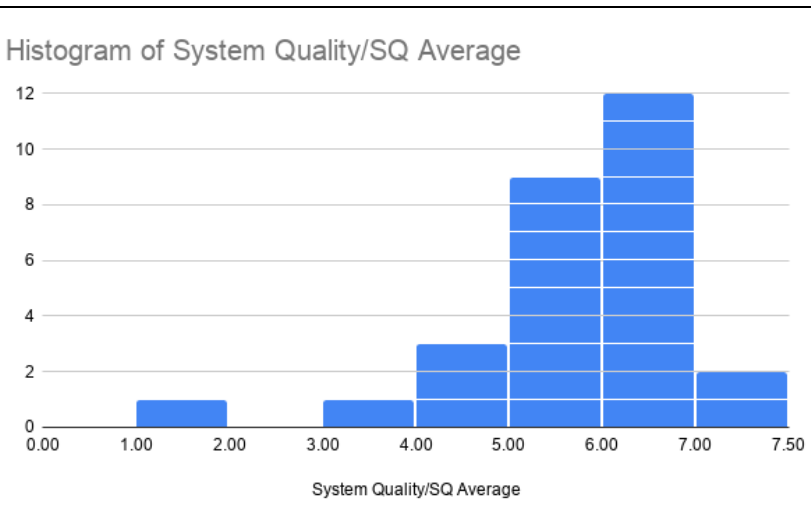

Figure 3. System Quality

Figure 3 is composed of a lot of variance among the responses. Again, 5 students are not satisfied and rated the system quality as poor from a ranges 1 to 5. On the other hand, 12 out of 30 students consider the system to be successful. 9 students also considered the system to be successful as they rated the system quality from ranges 5 to 6.

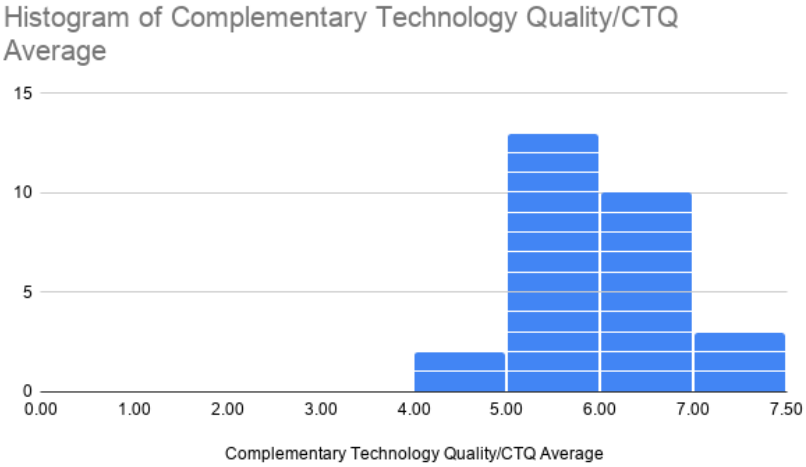

Figure 4. Complementary Technology Quality

Figure 4 shows no variance. 13 out of 30 students consider that the technology they utilize to access Moodle is effective. The second most responses were from ranges 5 to 6, of which 10 students consider the complementary technology quality to be effective. However, 2 students do not consider it to be so effective.

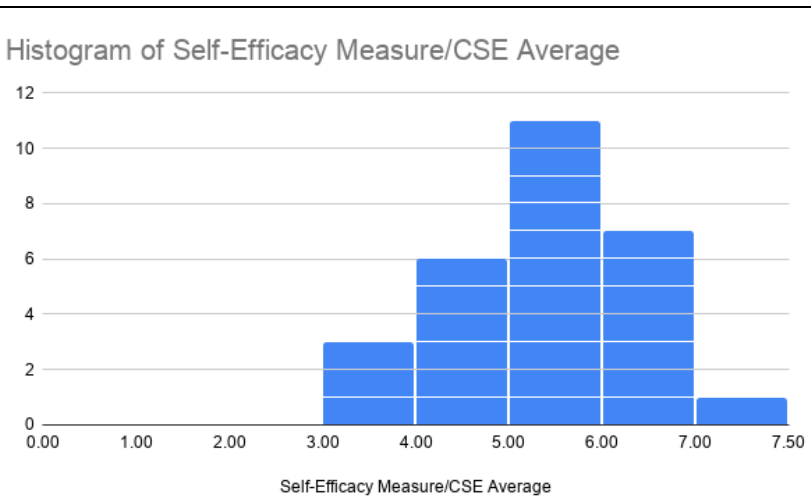

Figure 5. Computer Self-Efficacy Measure

Figure 5 shows the responses of students that consider that they can use Moodle with little to no help. There was little to no variance in this histogram. 11 out of 30 students rated the computer self-efficacy measure from ranges 5 to 6, considering that they can utilize Moodle without the help of someone. Also, 7 additional students consider that they can also use Moodle without help as their responses ranged from 6 to 7. 1 student who rated from ranges 7 to 7.5 revealed that he/she can effectively use Moodle without any help. While 3 out 30 students consider that they cannot use Moodle without the help of someone.

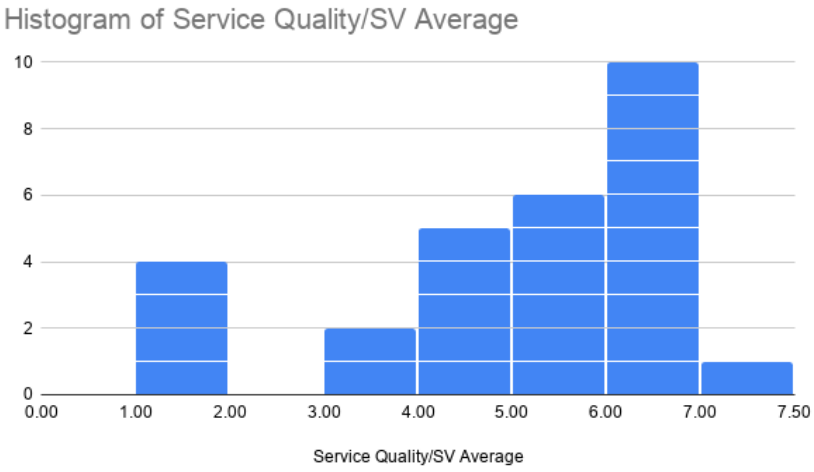

Figure 6. Service Quality

Figure 6 shows the responses of students in terms of the maintenance of the information system by the Information Technology (IT) Department. There was a lot of variance in this chart. Most responses were from ranges 6-7, where 10 students consider that the IT Department is doing their job by keeping the system up to date. 6 additional students also consider that the service quality is satisfactory while 1 student considered that it is very satisfactory. However, 5 students out of 30 students responded that the service quality is neutral, as they rated it from ranges 4 to 5. On the other hand, 4 out 30 students believed that the service quality of Moodle is poor.

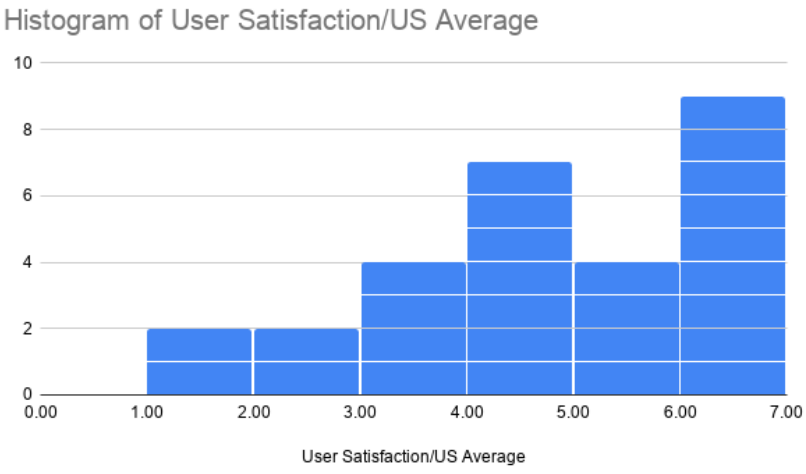

Figure 7. User Satisfaction

Figure 7 shows the level of satisfaction in regards to Moodle among students at Independence Junior College. There were many variances among the responses. 13 out of 30 students are satisfied with the use of Moodle at the junior college, which are the responses from ranges from the 5th to the 7th scale. 7 out of 30 students consider their level of user satisfaction to be neutral, fair and just. While 8 out of 30 students are not satisfied with the use of Moodle as their responses ranged from the 1st scale to the 4th scale.

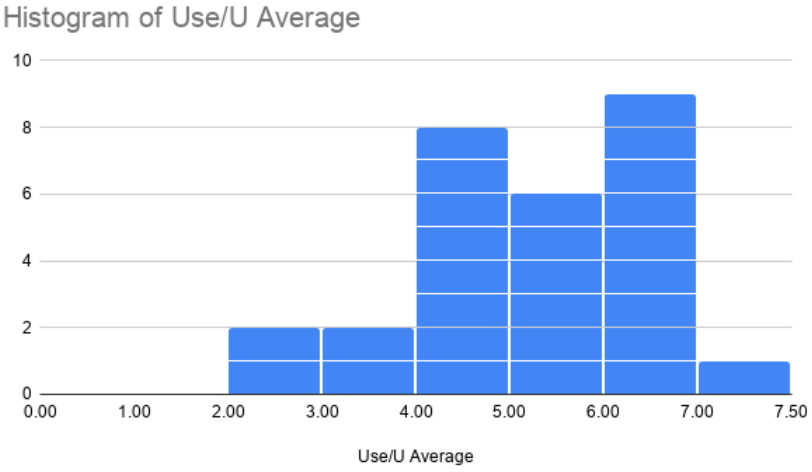

Figure 8. Use

Figure 8 shows the use of Moodle which is based on the frequency, dependency, knowledge and ability to complete tasks using the information system. Again, there was variance within the responses. 16 out 30 students depend on Moodle to complete tasks, as their responses ranged from the 5th to 7.5th scale. On the other hand, 8 students had neutral responses as they rated the use of Moodle from ranges 4 to 5. Also, 4 students seem to not frequently use Moodle nor depend on it to complete various tasks.

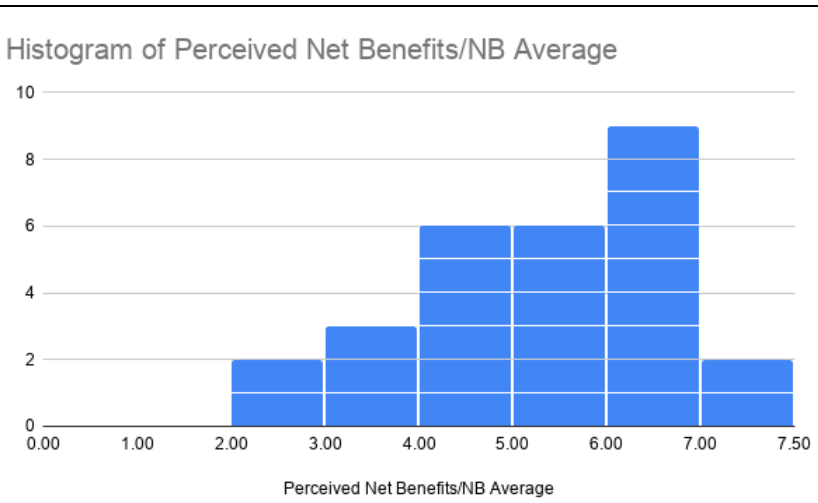

Figure 9. Perceived Net Benefits

Figure 9 displays the students' opinion in regards to Moodle enhancing their academic performance. There is variance among the responses in regards to the benefits of Moodle. Nonetheless, 17 out of 30 students consider that Moodle enhances their academic performance as their responses ranged from the 5th to the 7.5th scale. While 6 out of 30 students consider that the perceived net benefit of the information system is neutral. On the other hand, 5 students do not agree that Moodle enhances their academic performance.

Discussion

Independence provides fairly amount of information to students regarding Moodle. The service quality of the information system can be classified as successful since it was the second highest construct with an average of 5.72. Based on students' perspectives, Moodle is easy to use, provide a reasonable amount of interactive features between users and the system, it is user friendly and it provides moderate speed information access. Complementary technology quality was the highest construct with an average of 5.78. This signifies that the software, hardware and internet utilized by students' complements with the use of Moodle.

In terms of computer self-efficacy measures, majority of the students agree that they can complete a task on Moodle without any help. Computer self-efficacy measures had a total average of 5. 17. User satisfaction was the construct with the lowest average followed by service quality. The averages include 4.74 and 4.93 respectively. User satisfaction signifies that students do not have a positive attitude towards Moodle and that it had not met their expectations. The low average for service quality indicates that the IT technicians are not properly maintaining the information system and keeping it up to date. As a result, there is room for improvement which can then increase user satisfaction.

The use of Moodle among students at Independence Junior College is high. Based on the results, many students depend on Moodle to achieve academic goals. While quite a number of students do not frequently utilize Moodle and believe they do not have the necessary knowledge to use Moodle. As a result, they do not depend on the information system. It regards to perceived net benefit, it resulted in an average of 5.15. Overall, students believe that Moodle assist them in achieving their academic goals; however, they are still not fully satisfied with the learning management system.

There was variance among the responses. This is because there was a tendency towards Biology students not being satisfied. Based on the data, Biology students were the ones that had negative responses. As result, it is assumed that the lecturers in that program are not using Moodle or are not providing enough information that will assist students in better understanding the learning management system. Therefore, a major emphasis must be placed so that these students and lecturers can better communicate and enhance e-learning. If necessary changes are made, the level of user satisfaction will increase. Moodle will then become an asset to the institution and will add value to the junior college along with its mission statement.

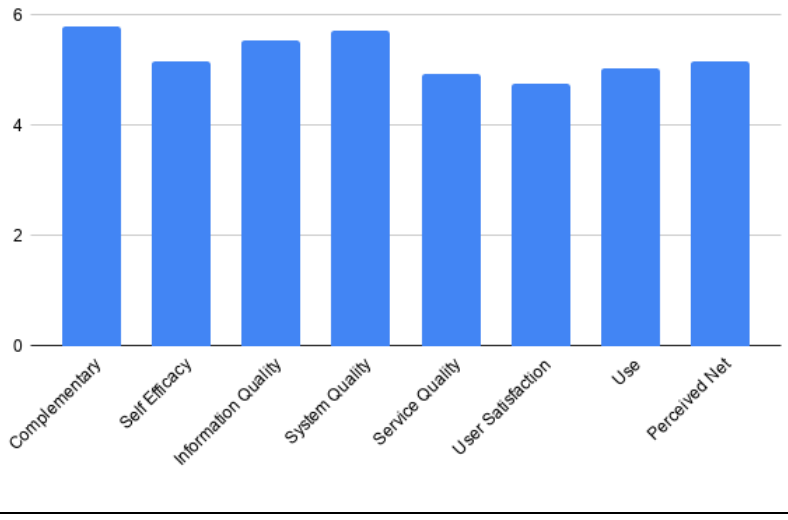

Figure 10. Average of the Overall Results

Figure 10 shows the average of the 8 constructs used to evaluate the success of Moodle at Independence Junior College. According to the bar chart above, students at Independence Junior College said that Moodle is moderately successful. Perceived net benefits are dependent on use and user satisfaction and it

should be an average of both. Based on the bar chart, it is a little above the average. Out of use and user satisfaction, most students use it; however, they are less satisfied. Therefore, the institution should focus on both; however, a greater emphasis must be placed on user satisfaction.

User satisfaction is dependent on service quality, system quality and information quality. In terms of service quality, the Information Technology (IT) technicians are not doing their job. They are not communicating and keeping the system up to date. As a result, if the service quality improves, use and user satisfaction will increase. System quality is Moodle itself and it is considered to be good.

Information quality is low. Teachers need to post information in a timely manner. Therefore, teachers need to be trained and keep the system updated with information that will allow students to increase their academic performance. In terms of self-efficacy, it was a bit low. Therefore, the institution should provide training to students so that they can have the necessary knowledge and skills to use the system. By doing this, they will increase the use of the information system and can even depend on it to complete certain tasks. For complementary technology, there is room for improvement so that the internet, software and hardware can better complement with the information system. As a result, Moodle at Independence Junior College is moderately successful and there is room to improve many things that will increase the success of the information system.

Conclusion

This research revealed that Moodle adds value to Independence Junior College. However, users are not aware of it. The junior college should provide Moodle Training for students. This will enhance the use and user satisfaction. There are students who still cannot complete a task without the help of someone. As result, Moodle Training should be provided at the beginning of the semester so that students have the necessary skills to complete task using the learning management system.

Also, teachers should be trained so that the information quality increase and therefore keep the system up to date. In terms of service quality, there should be great improvement. The IT technicians are not communicating and keeping the system up to date. If there is improvement, more students will have a positive outlook on the information system and the use and user satisfaction of Moodle will increase. Also a great emphasis must be placed on the Biology program because students in that program seem to be the least satisfied set of students with the information system.

Therefore, we recommend that the institution arrange training for both students and teachers. Students should be training on how to properly use Moodle, access information and perform tasks. Teachers should be trained on the importance of e-learning and the positive effect it can have on students' academic performance. If the recommendations are followed, Moodle will continue to add value to the institution.

Limitations

A major limitation for this research was that we did not have the authority to access the information system to evaluate how effective it is and how it can be improved. Also, the location of the institution was of a great distance. As a result, there were challenges for the researchers to acquire data. Another major limitation was the time frame and the sample size. Time was a limitation for this research because it did not allow us to use a greater sample size for there to be a more accurate result. In terms of the sample size, it only catered to a small amount of students. There were students in some programs that were not in the sample such as the Agriculture and Mathematics students. In order to acquire more data, it would be better to have a larger sample that will cater for students in all the programs being offered by Independence Junior College.

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