


# Factors Influencing Student Satisfaction Towards Using Learning Management System Moodle

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## ABSTRACT

Higher education institutions are increasingly adopting learning management systems (LMS) as a complementary tool in improving learning systems. The purpose of this study is explore the factors influencing students' satisfaction in Palestine Technical University-Khadoury (PTUK) in Palestine toward using the learning management system (Moodle). Six potential factors were used including perceived ease of use, perceived usefulness, information quality, system quality, service quality, and computer self-efficacy. Surveying strategy was used to collect the required data; 372 questionnaires were analyzed using simple and multiple regression. The findings revealed that all the examined predictors had significant influence on students' satisfaction toward using LMS. These findings enrich the previous literature with input towards adopting learning management systems in higher education institutions. The authors recommended that the LMS at PTUK should be integrated with social media platforms, and designed in a way that allow it to work fully and properly on mobile phones.

## KEYWORDS

Computer Self-Efficacy, Information Quality, Learning Management System, LMS, Moodle, Perceived Ease of Use, Perceived Usefulness, PTUK, Satisfaction, Service Quality, System Quality

## INTRODUCTION

Nowadays the use of Learning Management Systems (LMS) in higher education is widely common (Navimipour & Zareie, 2015). This could be attributed to its potential to accommodate interactive, flexible and decentralized teaching (Luo, Murray, & Crompton, 2017). LMS could be defined as an information technology system that provides instructors with the flexibility needed to build, maintain and update information related to the courses hosted online by websites (Ghazal, Aldowah, Umar, & Bervell, 2018). LMS provides an integral role to the traditional educational system that allows students to access information related to their courses anytime anywhere (Al-Samarraie, Selim, Teo, & Zaqout, 2017). Utilizing LMS in the educational process leads to many merits including: materials arrangements; organizing independent students' work; the ability to develop tests and assignments; the ability to monitor the activities; and assessment system development (Snytnikova, 2016).

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Various LMS are being used such as BlackBoard, WebCT, Moodle etc. The Moodle platform is the most common open source LMS (Kushwaha, Singhal, & Swain, 2019). It provides some advantages including ability to work in any operating system that is compatible with PHP and allowing users to remove or add elements in a flexible way at any stage (Kerimbayev, Kultan, Abdykarimova & Akramova, 2017). In addition, The Moodle platform allows the creation of students' tests and questionnaires' and managing these tasks (Costa, Alvelosa, & Teixeira, 2012).

Integrating such online components in the educational process has strengthened communications, allowed more access to the resources and created a higher level of students satisfaction (Horvat, Dobrota, Krsmanovic, & Cudanov, 2015). Instructors as well as students satisfaction plays an important role in accepting LMS (Almarashdeh, 2016). Student satisfaction could be defined as the total perceived value of a student's educational experiences in an educational institution (Astin, 1993). Many factors may influence the level of satisfaction of LMS in developing counties including ICT infrastructure, self-competencies, instructional efforts, and resource accessibility and availability (Ghazal et al, 2018). Other researchers examined different factors such as system quality, information quality, service quality, perceived ease of use and perceived usefulness (Almarashdeh, 2016); computer anxiety, technology related experiences, computer self-efficacy, service quality, system quality, information quality, perceived usefulness and perceived ease of use (Ghazal et al, 2018).

In Palestine, most of the higher education institutions have adopted LMS in the educational process. Palestine Technical University Khadoury (PTUK) is one of these institutions that adopts a mixture of face-to-face and online learning which is usually referred to as blended learning. Many researchers believe that blended learning is the best teaching model for the future (Feshchenko, Mozhaeva, Kulikov & Zilberman, 2015). PTUK included the Moodle LMS as a major component in its official website to facilitate the interaction between instructors and students, as well as to consider the different needs of students who have different background levels of knowledge. The adoption of blended learning would help in cases were students are not satisfied with traditional learning.

Unfortunately, no previous assessment was conducted to measure the level of perceived student satisfaction towards the use of LMS. Therefore, this study aims to investigate the factors that may influence students' level of satisfaction of using LMS. Besides that, determining the relative importance of each of these factors, and then derive conclusions and recommendations to PTUK administration to improve the LMS.

## LITERATURE REVIEW

Many studies have been undertaken to measure the level of satisfaction of the users of LMS in various contexts. The evaluation of LMS has been conducted from different perspectives: instructors (Almarashdeh, 2016); administrators (Naveh, Tubin, & Pliskin, 2010); and students perspectives (Alqurashi, 2019). The success of LMS is determined by different factors that should be taken into account to create an effective and successful learning environment. Among the most common variables in previous studies are perceived usefulness, perceived ease of use, computer self-efficacy, service quality, information quality and system quality (Almahamid & Rub, 2011; Qteishat, Alshibly, & Al-Ma'aitah, 2013; Islam & Azad, 2015; Ghazal et al, 2018).

### LMS Acceptance

The LMS is a typical software that supports in document, report, track and provides e-learning courses (Zaharias & Pappas, 2016). In order to create interactive, well-designed, easy to use and effective systems. Universities should consider the potential factors that may influence users' satisfaction towards using these LMSs. These factors are related to the technology itself (system quality, information content,..etc) and the human side represented by the users of the system and their willingness to accept and use the technology (Hammouri & Abu-Shanab, 2018). Technology Acceptance Model (TAM) was originally introduced by Davis (1989), since then, enormous amount

of research have used this model in its original form or in a modified model of it (TAM2, TAM3) to measure users' acceptance of Information Technology systems (IT). TAM consists of any potential factors that may influence perceived ease of use and perceived usefulness (Lin, Persada & Nadlifatin, 2014). The validity of using TAM as a model representing theoretical framework for explaining and predicting technology acceptance has been confirmed by several studies (Al-Gahtani, 2016; Fathema, Shannon & Ross, 2015; Hsia, Chang & Tseng, 2014; Wu & Zhang, 2014; Tarhini, Hone & Liu, 2014). These studies have used either TAM or some of its constructs along with other constructs to design a model for predicting user satisfaction and intentions to use, the results confirmed that TAM is valid for predicting technology acceptance.

Perceived ease of use in the current study is interpreted as the degree to which a student does not have to exert much effort to use the Moodle LMS; Whereas perceived usefulness is the student's motivational belief that the use of the Moodle LMS can improve his/her performance (Lin, Persada & Nadlifatin, 2014). Almahamid and Rub (2011) found that perceived usefulness is a significant predictor of students' satisfaction in using e-learning. Similarly, Hammouri and Abu-Shanab (2018) indicated that both perceived ease of use and perceived usefulness have apposite impact on students' satisfaction. On the other hand, satisfaction with using LMS has been examined from instructors' point of view as well. Al-Samarraie, Teng, Alzahrani, and Alalwan (2018) and Almarashdeh (2016) pointed that perceived usefulness was among the most influencing factors on users satisfaction toward LMSs, whereas perceived ease of use was not significant in Almarashdeh (2016) and Al-Samarraie et al (2018) perceived ease of use was not among the examined factors. Most of the previous studies revealed that perceived usefulness and perceived ease of use are the most key factors influencing students' satisfaction toward LMS (Islam & Azad, 2015).

Based on the above discussion, the following hypotheses are formulated:

**Hypothesis One:** Perceived Ease of Use (PEOU) of LMS has no significant' influence on students' satisfaction.

**Hypothesis Two:** Perceived Usefulness (PU) of LMS has no significant' influence on students' satisfaction.

### Information Quality

The main role of any information system is to provide information to its users. The quality of information provided by the system could be assessed by semantic success measures such as timeliness, accuracy, completeness, consistency and relevance (Delone & McLean, 2003). Providing a higher level of information quality will produce a higher level of satisfaction toward the system (Ghasemaghahi & Hassanein, 2015). Al-Samarraie et al (2018) pointed that information quality was among the core factors influencing user satisfaction for both instructors and students. Furthermore, Information quality has been found to have a positive significant influence on students' satisfaction toward using LMS (Hammouri & Abu-Shanab; 2018; Jafari, Salem, Moaddab & Salem, 2015; Shaltoni, Khraim, Abuhamad, & Amer, 2015; Lwoga, 2014; Almahamid & Rub, 2011). Thus, in order to test whether information quality influences students' satisfaction in PTUK towards using the Moodle, the third hypothesis reads:

**Hypothesis Three:** Information Quality (IQ) of LMS has no significant' influence on students' satisfaction.

### System Quality

System quality refers to the performance of the system from user perception (Jafari et al, 2015). Talafha and Abu-Shanab (2015) indicated that system quality could be measured by organizational and individual impacts, technical success and users' satisfaction. More particularly, system quality

metrics include usability, responsiveness, availability, adaptability and reliability (Delone & Mclean, 2004). The impact of system quality on students' satisfaction was found significant in many previous studies (Ghazal et al., 2018; Hammouri & Abu-Shanab; 2018; Mtebe & Raphael, 2018; Jafari et al, 2015; Shaltoni et al, 2015; Lwoga, 2014; Noorman bin Masrek, 2010). The more that students believe that the LMS is available and reliable the more they are satisfied. Hence, the forth hypothesis reads:

**Hypothesis Four:** System Quality (SyQ) of LMS has no significant' influence on students' satisfaction.

### **Service Quality**

Originally, service quality construct could be defined as "The overall support delivered by the service provider" (Noorman bin Masrek, 2010). In the current study, it refers to the service characteristics provided by ICT Department at the University including responsiveness, availability and effectiveness. Service quality has been examined in many studies as a predictor for students' satisfaction. Almarashdeh (2016) found that service quality was a key predictor of instructors' satisfaction. The results of other studies as well emphasized the importance of service quality in predicting students' satisfaction (Mtebe & Raphael, 2018; Lwoga, 2014; Almahamid & Rub, 2011; Noorman bin Masrek, 2010). On the other hand, Ghazal et al. (2018) pointed that service quality has no significant influence on students' satisfaction. Based on these results, in order to examine the quality of the service provided by the ICT department and its role in gaining students' satisfaction the following hypothesis:

**Hypothesis Five:** Service Quality (SvQ) of LMS has no significant' influence on students' satisfaction

### **Computer Self-Efficacy**

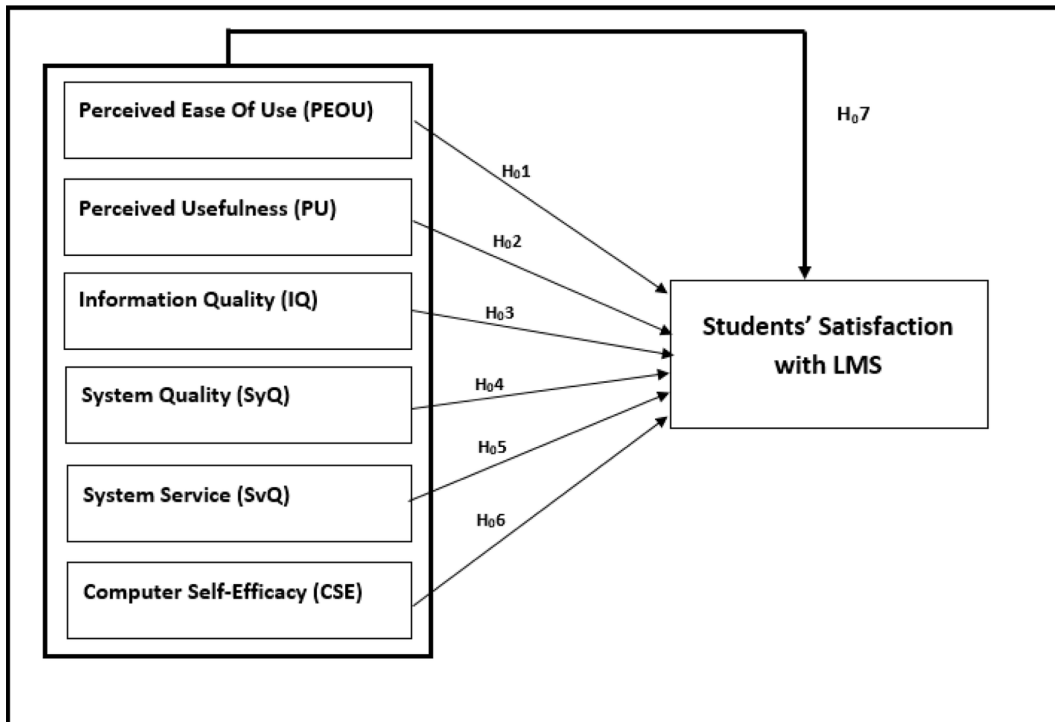
Computer Self-efficacy is an important element in behavioral studies and for a wide range of technology related studies (Abu-Shanab, Md Nor, Pearson & Crosby, 2003). Computer self-efficacy is interpreted as individual's self-belief regarding his/her ability to accomplish a certain task using a computer (Shen & Eder, 2009, p.226). A student's computer self-efficacy can affect his-her usage of the LMS, since if the student posses a high level of computer self-efficacy, he/she would consider using the computer easy, where as a student's who is not confident to use computers my not use them (Binyamin, Rutter & Smith, 2018). This suggests that computer self-efficacy level would even influence students' perception level of e-learning benefits, since computer self-efficacy is a critical predictor of perceived learning (Alqurashi, 2019). Furthermore, computer self-efficacy is a key predictor in accepting e-learning (Tarhini, Arachchilage & Abbasi 2015; Fathema et al., 2015). In according with this, computer self-efficacy was found as a significant predictor of students' satisfaction in LMS (Ghazal et al, 2018; Hammouri & Abu-Shanab; 2018; Noorman bin Masrek, 2010). Based on this the sixth hypothesis is formulated:

**Hypothesis Six:** Computer Self-Efficacy (CSE) of the student has no significant' influence on students' satisfaction.

### **Student Satisfaction**

In general, satisfaction refers to the individual feeling of pleasure or depression toward something as a result of comparison between his expectations and the perceived outcomes (Kotler & Keller, 2012). In e-learning environments, student satisfaction is the degree to which students believe that the LMS meet their informational needs (Almarashdeh, 2016). Students usually depend on their satisfaction level with LMS to judge it; hence, if their satisfaction level is high they continue to use LMS (Limayem & Cheung, 2011). Additionally, students satisfaction has a direct impact on commitment, absenteeism level, productivity and performance (Hammouri & Abu-Shanab; 2018).

Figure 1. Research model



This study aims to analyze the impact of all the pre mentioned independent factors together on students' satisfaction by building a model for predicting students' satisfaction, thus the following hypothesis is proposed:

**Hypothesis Seven:** PEOU, PU, IQ, SyQ, SvQ, and CSE together of the LMS have no significant influence on students' satisfaction.

Figure 1 illustrates the research model of the current study.

## METHODOLOGY

### Data Collection Method

The proposed model presented in this study is based on previous literature to select the potential factors that may influence students' satisfaction toward using the LMS Moodle at PTUK. Six factors were chosen as predictors for students' satisfaction. This study is of an explanatory nature, therefore a questionnaire approach has been adopted to gather the required data (Appendix 1). The questionnaire consisted of two parts: the first part was related to the items that measure the demographic characteristics of the surveyed students, whereas the second part was about the items that measure the factors of the study. Each factor consisted of four items that were selected from previous related work. The items for measuring PEOU were adopted from Davis (1989) as they have been used since then by many researchers and their reliability and validity have been verified. PU items were adopted from (Limayem, Hirt, & Cheung, 2007). IQ items (Lwoga, 2014); SyQ items (Liaw, 2008; Lwoga, 2014); SvQ items (Balaban et al., 2013; Cheng, 2012; Zaharias & Pappas, 2016; Shaltoni

Table 1. Cronbach Alpha Coefficient of the suggested model variables

| Predictor | Mean | Standard Deviation | Cronbach Alpha Coefficient |
|-----------|------|--------------------|----------------------------|
| PEOU      | 3.66 | 0.943              | 0.873                      |
| PU        | 3.67 | 0.948              | 0.851                      |
| IQ        | 3.62 | 0.834              | 0.787                      |
| SyQ       | 3.45 | 0.917              | 0.809                      |
| SvQ       | 3.56 | 0.943              | 0.825                      |
| CSE       | 3.58 | 0.927              | 0.831                      |
| SS        | 3.58 | 0.942              | 0.891                      |
| Total     |      |                    | 0.951                      |

Source: Authors', 2019

et al., 2015); CSE items (Binyamin et al., 2018) and SS items (Shaltoni, 2015). Most of these items have been modified to suit the context of the current study. A five point Likert Scale was used. The scale ranged from (5: Strongly Agree) to (1: Strongly Disagree). The questionnaire was distributed in Arabic Language to guarantee full understanding of the items.

### Reliability

The reliability of these items was tested using Cronbach Alpha Coefficient as shown in Table 1). All of the coefficient values were above the cutoff value of 0.7 determined by (Nunnally, 1978) as the acceptance measure for reliability.

In addition, the current research used linear regression models were used to examine the proposed hypotheses.

### Sampling

The researchers used simple stratified sampling to collect the data since there might be a variation among targeted students based the college and the academic level of the students. The population of the study is the student society of PTUK. The total number of the enrolled students at PTUK by the end of academic year 2018/2019 was 6745 students distributed in six colleges including Engineering, Applied Sciences, Art, Business, Agriculture and Palestine Technical College. The required sample size that should be drawn from the population at 5% significance level is 364 based on Daniel and Cross (2013) equation. A total of 400 questionnaires were distributed, 372 questionnaire were received and valid for analysis with response rate 93%.

The ratio of each college was calculated based on the total number of students in each college, the total numbers of students in the university and the total number of questionnaires to be distributed. These ratios were Engineering 28.6%, Applied Sciences 7.42%, Art 8.45%, % 27.4, Agriculture 3.23%, and Palestine Technical College 24.7% .

## DATA ANALYSIS

### Demographic Profile

Table 2 presents demographic profile of the students surveyed for the purposes of this study.

As table (2) illustrates, the population sample was made up of 45.7% males and 54.3% females, where 52.4% of the respondents within the age group of (20-22 years), followed by age group (17-19 years) forming 39.2%, then (23-25 years) with 7.0% and last came the age group (>25 years) with

Table 2. Students' demographic profile

| Demographic Category  | Classification                        | Frequency  | Percent %  |
|-----------------------|---------------------------------------|------------|------------|
| Gender                | Male                                  | 170        | 45.7       |
|                       | Female                                | 202        | 54.3       |
|                       | <b>Total</b>                          | <b>372</b> | <b>100</b> |
| Age                   | 17-19 Years                           | 146        | 39.2       |
|                       | 20-22 Years                           | 195        | 52.4       |
|                       | 23-25 Years                           | 26         | 7.0        |
|                       | >25 Years                             | 5          | 1.3        |
|                       | <b>Total</b>                          | <b>372</b> | <b>100</b> |
| College               | Engineering                           | 109        | 29.3       |
|                       | Applied Sciences                      | 28         | 7.5        |
|                       | Art                                   | 30         | 8.1        |
|                       | Business                              | 100        | 26.9       |
|                       | Agriculture                           | 13         | 3.5        |
|                       | Palestine Technical College (Diploma) | 92         | 24.7       |
|                       | <b>Total</b>                          | <b>372</b> | <b>100</b> |
| Academic Level        | First year                            | 117        | 31.5       |
|                       | Second year                           | 86         | 23.1       |
|                       | Third year                            | 81         | 21.8       |
|                       | Fourth year                           | 65         | 17.5       |
|                       | Fifth year                            | 23         | 6.2        |
|                       | <b>Total</b>                          | <b>372</b> | <b>100</b> |
| Duration of using LMS | 1-2 Semesters                         | 266        | 71.5       |
|                       | 3-4 Semesters                         | 106        | 28.5       |
|                       | <b>Total</b>                          | <b>372</b> | <b>100</b> |

Source: Authors', 2019

1.3%. Regarding the academic level of the surveyed students, the majority were first year students with 31.5%, where the lowest percentage was (6.2%) for the fifth year, since all specializations are four-years program students except Engineering with a five years program. The last demographic factor was the duration of using the Moodle, 71.5% of the students started to use the Moodle about a year ago, while 28.5% of the students have used it for about two years.

To analyze the degree of students' satisfaction toward using the Moodle, their mean satisfaction values based on these demographic factors were calculated as shown in Table 3.

Male and female students have almost the same degree of satisfaction toward using Moodle LMS at PTUK. Regarding age, students aged more than 25 years had the highest level of students satisfaction with a value of 3.8, next came students within age group of 17-19 years and age group 23-25 years with almost the same level of students' satisfaction, finally students within the age group 20-22 years had the lowest level of satisfaction toward using Moodle LMS. Agriculture College students' had the highest level of satisfaction with a value of (4.09), followed by the students of Applied Sciences and Art students' with a value of (3.7). Engineering students came next with a mean satisfaction of

Table 3. Respondents mean satisfaction value based on demographic factors

| Demographic Category  | Classification                        | Mean Satisfaction | Standard Deviation |
|-----------------------|---------------------------------------|-------------------|--------------------|
| Gender                | Male                                  | 3.5932            | 1.04609            |
|                       | Female                                | 3.5730            | .93637             |
| Age                   | 17-19 Years                           | 3.7380            | .93511             |
|                       | 20-22 Years                           | 3.4420            | 1.03635            |
|                       | 23-25 Years                           | 3.7115            | .80837             |
|                       | >25 Years                             | 3.8000            | .64711             |
| College               | Engineering                           | 3.6134            | .87501             |
|                       | Applied Sciences                      | 3.7857            | 1.49337            |
|                       | Art                                   | 3.7583            | .77816             |
|                       | Business                              | 3.4650            | .96793             |
|                       | Agriculture                           | 4.0962            | .65779             |
|                       | Palestine Technical College (Diploma) | 3.4810            | 1.01921            |
| Academic Level        | First year                            | 3.7628            | .90070             |
|                       | Second year                           | 3.4912            | 1.01216            |
|                       | Third year                            | 3.5123            | 1.04201            |
|                       | Fourth year                           | 3.5231            | 1.00168            |
|                       | Fifth year                            | 3.4130            | 1.02416            |
| Duration of using LMS | 1-2 Semesters                         | 3.6472            | .95050             |
|                       | 3-4 Semesters                         | 3.4198            | 1.05872            |
|                       | <b>Total</b>                          | <b>3.5822</b>     | <b>.98656</b>      |

Source: Authors' 2019

3.6, whereas the students of Business College and Palestine Technical College had the lowest mean satisfaction with a value of 3.4. On the other hand, the values of students mean satisfaction based on the academic level were approximately the same except for first year students who had the highest mean satisfaction with a value of (3.7). Students who have used the Moodle for 1-2semesters had a mean satisfaction of (3.6) which is slightly higher than those students who used the Moodle for 3-4 semesters. In general, the mean satisfaction of all students toward using the Moodle was 3.58 which reflects an acceptable level of satisfaction.

### Hypotheses Testing

In order to test the hypotheses, simple linear regression was used. Simple linear Regression assumes that data follow a normal distribution, therefore before applying the regression, a normality test was applied. The results showed that the data were not normally distributed, thus the data were converted to normal distribution first, then simple regression was conducted.

#### *Simple Linear Regression of ( $H_01$ .... $H_06$ )*

Pearson correlation coefficient was used to measure the correlations between these variables and students' satisfaction, the results are shown in Table 4.



Table 4. Pearson correlation coefficients

| Independent Factor | Students' Satisfaction |
|--------------------|------------------------|
| PEOU               | 0.596                  |
| PU                 | 0.622                  |
| IQ                 | 0.628                  |
| SyQ                | 0.688                  |
| SvQ                | 0.616                  |
| CSE                | 0.626                  |

Source: Authors', 2019

As shown in Table (4), positive correlations exist between each of the independent variables and students' satisfaction, as the values of correlation coefficient ranged from 0.596 to 0.688.

The next step was to build a simple regression model for each hypothesis to examine the direct influence of the independent variable on students' satisfaction. All of the six models were significant, indicating a positive influence of each of these factors on students' satisfaction. Thus, this led to the rejection of the null hypotheses (H01, H02, H03, H04, H05, H06). A summary of these models is presented in Table 5.

From Table (5), it is noticed that for the first independent factor PEOU, a model for predicting students' satisfaction can be derived as follows:

$$SS = 1.399 + 0.595PEOU \tag{1}$$

This model is significant with  $R^2 = 0.355$ , meaning that PEOU alone is responsible for 35.5% of the variations in students satisfaction. Similarly, for the other five factors, five simple linear models could be derived yielding the following equations (Equation 2 through Equation 6):

Table 5. A summary of simple linear model of independent factors Source: Authors', 2019

| Model   | R <sup>2</sup> | Adjusted R <sup>2</sup> | Std. Error of the Estimate | Unstandardized Coefficients B |       | Standardized Coefficients Beta | t      | Sig.  | Decision     |
|---------|----------------|-------------------------|----------------------------|-------------------------------|-------|--------------------------------|--------|-------|--------------|
| 1. PEOU | 0.355          | 0.353                   | 0.758                      | Constant                      | 1.399 | 0.596                          | 8.849  | .000* | H01 Rejected |
|         |                |                         |                            | PEOU                          | 0.595 |                                | 14.241 | .000* |              |
| 2. PU   | 0.387          | 0.385                   | 0.736                      | Constant                      | 1.316 | 0.622                          | 8.581  | .000* | H02 Rejected |
|         |                |                         |                            | PU                            | 0.617 |                                | 15.253 | .000* |              |
| 3. IQ   | 0.394          | 0.393                   | 0.734                      | Constant                      | 1.017 | 0.628                          | 5.995  | .000* | H03 Rejected |
|         |                |                         |                            | IQ                            | 0.708 |                                | 15.501 | .000* |              |
| 4. SyQ  | 0.473          | 0.472                   | 0.685                      | Constant                      | 1.143 | 0.688                          | 8.247  | .000* | H04 Rejected |
|         |                |                         |                            | SyQ                           | 0.706 |                                | 18.205 | .000* |              |
| 5. SvQ  | 0.379          | 0.377                   | 0.743                      | Constant                      | 1.517 | 0.616                          | 10.625 | .000* | H05 Rejected |
|         |                |                         |                            | SvQ                           | 0.615 |                                | 15.003 | .000* |              |
| 6. CSE  | 0.391          | 0.390                   | 0.736                      | Constant                      | 1.312 | 0.626                          | 8.623  | .000* | H06 Rejected |
|         |                |                         |                            | CSE                           | 0.635 |                                | 15.407 | .000* |              |

$$SS = 1.316 + 0.617 PU. \tag{2}$$

$$SS = 1.017 + 0.708 IQ \tag{3}$$

$$SS = 1.143 + 0.706 SyQ \tag{4}$$

$$SS = 1.517 + 0.615 SvQ \tag{5}$$

$$SS = 1.312 + 0.635 CSE. \tag{6}$$

Each of these models is responsible for the variation in students' satisfaction by 38.7%, 39.4%, 47.3%, 37.9%, and 39.1% respectively.

**Multiple Linear Regression of ( $H_07$ )**

The last step in the analysis was to examine the overall influence of all of these factors on students' satisfaction simultaneously by building a multiple linear regression model. Table 6 summarizes this model:

**Table 6. Multiple regression model's summary**

| Model   | R     | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|-------|----------|-------------------|----------------------------|
| 1   | 0.800 | .639     | .634              | .57013                     |
| Predictors: (Constant), CSE, IQ, SvQ, PEOU, PU, SyQ |       |          |                   |                            |

Source: Authors', 2019

From Table (6), it is clear that there is a positive correlation of these factors and students' satisfaction since the multiple correlation coefficient is  $r=.800$ ; with determination coefficient  $R^2 = 0.639$ . This means that 63.9% of the variation in students' satisfaction toward using LMS Moodle is explained by these factors. Table 7 illustrates ANOVA table of the multiple regression model.

**Table 7. ANOVA table of multiple regression model**

| Model   |            | Sum of Squares | df  | Mean Square | F       | Sig. |
|---|------------|----------------|-----|-------------|---------|------|
| 1   | Regression | 209.866        | 6   | 34.978      | 107.607 | .000 |
|   | Residual   | 118.318        | 364 | .325        |         |      |
|   | Total      | 328.184        | 370 |             |         |      |
| Predictors: (Constant), CSE, IQ, SvQ, PEOU, PU, SyQ; Dep. Var.: Students' Satisfaction (SS) |            |                |     |             |         |      |

Source: Authors', 2019

The result of table (7) is significant since p-value = 0.000 which is less than  $\alpha = 0.05$  specified in the hypothesis. This means that there is statistically significant impact at level of significant  $\alpha = 0.05$  of these factors together on students' satisfaction toward using the LMS Moodle at PTUK.

Table 8 shows the coefficients of each factor in the multiple regression model:

Table (8) shows that a significant impact of all predictors: PEOU with p-value = 0.004, PU with p-value = 0.000, IQ p-value = 0.003, SyQ with p-value = 0.000, SvQ with p-value = 0.004 and CSE with p-value = 0.000. This means we can rewrite a regression model with significant factor to explain the impact of these predictors on students' satisfaction toward using LMS Moodle as appears in Equation (7):

**Table 8. Multiple regression coefficients**

| Model   | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig.  | Collinearity Statistics |       |
|---|-----------------------------|------------|---------------------------|-------|-------|-------------------------|-------|
|   | B                           | Std. Error | Beta                      |       |       | Tolerance               | VIF   |
| (Constant)                                      | -.076                       | 0.151      |                           | -.505 | 0.614 |                         |       |
| PEOU  | 0.124                       | 0.043      | 0.124                     | 2.862 | 0.004 | 0.531                   | 1.884 |
| PU  | 0.169                       | 0.044      | 0.171                     | 3.877 | 0.000 | 0.512                   | 1.955 |
| IQ  | 0.154                       | 0.051      | 0.137                     | 3.010 | 0.003 | 0.481                   | 2.079 |
| SyQ   | 0.266                       | 0.051      | 0.259                     | 5.246 | 0.000 | 0.406                   | 2.464 |
| SvQ   | 0.128                       | 0.044      | 0.128                     | 2.880 | 0.004 | 0.503                   | 1.990 |
| CSE   | 0.190                       | 0.043      | 0.187                     | 4.381 | 0.000 | 0.543                   | 1.840 |
| Dependent Variable: Students' Satisfaction (SS) |                             |            |                           |       |       |                         |       |

Source: Authors', 2019

$$SS = -0.076 + 0.124 PEOU + 0.169 PU + 0.154 IQ + 0.266 SyQ + 0.128 SvQ + 0.190 CSE \dots \dots \dots \text{Equation 7}$$

looking to standardized beta it's clear that the System Quality (SyQ) is the most influencing factor on students' satisfaction since its standardized beta coefficient is 0.259 which is greater than the standardized beta coefficients of the other factors. Followed by Computer Self-Efficacy with a coefficient of 0.187, next came Perceived Usefulness (PU) with a coefficient of 0.171, then Information Quality (IQ) with a coefficient of 0.137, finally Perceived Ease Of Use (PEOU) and System Quality (SyQ) with approximately equal coefficients of 0.12.

To ensure that no multicollinearity exists between the predictors, the Variance Inflation Factor (VIF) was calculated as shown in the last right column. The values of VIF's are less than 5, which means nocollinearity exist between the independent factors (Rogerson, 2001).

## DISCUSSION

The reason behind conducting this study was to explore the level of influence of six potential factors on students satisfaction toward using LMS Moodle at PTUK as separated constructs and all together. The findings of simple regression models of each of these factors revealed that all of them had significant influence on students' satisfaction level toward using LMS. Regarding Perceived Ease of Use and Perceived Usefulness, the results matched the findings of previous work such as (Hammouri & Abu-Shanab 2018; Ghazalet al., 2018; shaltoni et al., 2015; Islam & Azad, 2015; Fathema et al., 2015). Other researchers have examined either perceived ease of use or perceived usefulness, Almarashdeh

(2016) found that perceived usefulness only had a significant influence on students' satisfaction. The result implies that when students believe that the system is not complicated to use and provide them with useful information they tend to be more satisfied with it.

System quality and service quality were found to be significant influencers on students' satisfaction. These results comply with the findings of (Hammouri & Abu-Shanab, 2018; Almarashdeh, 2016; Shaltoni et al., 2015; Almahamid & Rub, 2011). In the current study, system quality had the strongest impact on students' satisfaction this is similar to the findings of (Lwoga, 2014) who pointed that system quality were among the most influencing factors on students' satisfaction, whereas service quality had no significant influence on satisfaction. On the other hand, Shaltoni et al., (2015) found that system availability was the most influencing predictor on students' satisfaction, whereas Ghazal et al. (2018) pointed that service quality was not significant in predicting students' satisfaction. This emphasizes that students consider quality issues like interactivity, navigation speed and layout to be important in gaining their satisfaction. When students tend to believe that the LMS is interactive, has a proper layout through which materials can be easily accessed and responds quickly to any problems, they are more satisfied while using it. Similarly, the availability of the system and the supporting team behind the system should respond to the students' inquiries and provide them with the help they seek, this will enrich their satisfaction level.

Regarding information quality, this factor was significant as well. This result is in parallel with Hammouri and Abu-Shanab (2018), Shaltoni et al (2015), and Jafari et al. (2015) who revealed that IQ was the most determining factor of students' satisfaction. While contradicting the findings of Ghazal et al. (2018) and Mtebe and Raphael (2018) who found information quality to be insignificant in determining students' satisfaction. This result seems logical, since the core of any LMS is to provide students with relevant, accurate and updated information regarding their academic materials. If the LMS fulfill the students' needs so that they find the information available when needed, they are more satisfied with the system. It also reflect that students are aware of the importance of the information provided through the LMS and that they are satisfied with the quality level currently available at LMS Moodle. This result supports the argument of Hammouri and Abu-Shanab (2018), that when the informational content of the LMS is accurate, complete and readable the level of students' satisfactions will be higher

Students' computer self-efficacy level had a significant influence on students' satisfaction. This result in line with the findings of (Hammouri & Abu-Shanab, 2018; Ghazal et al., 2018; Noorman bin Masrek, 2010). Hammouri & Abu-Shanab (2018) revealed that computer self-efficacy was the most significant influencer on students' satisfaction. Students self-confidence to use technology is associated with their assessment on degree of difficulty and the usefulness of the system (Ghazal et al., 2018). As students' level of computer self-efficacy improves, their conviction that the system is easy to handle increases thus their level of satisfaction toward using the Moodle is enhanced.

The findings of this study supports the findings of most of the previous work on students' satisfaction toward using LMS, it adopted most of the important factors that influence students' satisfaction based on latest studies available in literature.

## **CONCLUSION AND RECOMMENDATIONS**

After reviewing the available literature, selecting the potential factors influencing students' satisfaction (that have proved by previous researchers), proposing a research model, gathering and analyzing the data, the study in hand concludes that the six suggested factors positively influence students' satisfaction with system quality as a dominant predictor. These findings are of great benefit for educational institutions in general that are working on adopting LMS, or improve their available one. And for PTUK in particular as it allowed the university administration to explore the level of satisfaction of its students toward using LMS Moodle. The university administration should maintain the quality level of the system since it has the strongest influence, and need to work harder

on improving other aspects of the system such as service quality which had the weakest influence on students' satisfaction. This could be accomplished by establishing a department at the Electronic Learning System at the university staffed with high quality personnel who can deal with any technical problems and provide constant support. In addition, integrating with social network sites is essential, particularly that most students these days use them to contact each other. Although LMS are equipped with the tools to present learning materials using multimedia such as audio and video (Mtebe, 2015), LMS still has difficulties with audio and video conferences (Dube & Scott, 2014), therefore students can benefit from these networks to share their learning materials while using the LMS. Improving students' level of computer self-efficacy would help in enhancing their satisfaction level toward using the Moodle. This could be applied by giving the new enrolled students, at the beginning of their study some lectures or workshops about the Moodle and how they can use it the best way during their academic life at the university. Additionally, with the tremendous attachment of users with their mobile phones (Mtebe,2015), taking advancements in mobile technology and designing the LMS to work fully and properly on mobile phones will enhance students' level of satisfaction and encourages them to use it, since the obligation of a having a personal computer to access the LMS is no longer necessary.

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