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Assessing Open Source Software Success in Learning Management Systems Context in Jordan: Applied Of an Integration of Technology Acceptance Model and Information Systems Success

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Abstract
The main purpose of this study is to depend on an integration of Technology Acceptance Model (TAM) and Information Systems Success (ISS) model that was altered to define the success variables of Open Source Software (OOS) based on Open-EMIS system that attaches to Education Ministry of Jordan by employees. The methodology of current study was built on quantitative approach with two waves of data collection (Pre and post- test). For test hypotheses purposes, the Structural Equation Model (SEM) was applied. Moreover, the added value of this research is to meet the poverty in literature engaged with OOS. It is also contributed at exploring how the Education Ministry of Jordan can reap benefits from Open-EMIS usage. The study disclosed perceived ease of use, perceived usefulness, service quality, system quality, information quality, user satisfaction and intention to use as important variables for influencing Open-EMIS usage; as important finding, the relationships between the variables in pre and post-phases do not differ significantly. Finally, the future work in OOS area is recommended to be conducted.

Keywords: OOS, TAM, ISS, Open-EMIS, Net Benefit.

1. Introduction

1.1 Background

OSS is an idiom applied for categorizing software with particular features of 'openness'. Through literature, many definitions of OSS are expressed .Techopedia (2012) marks open source software as "open source software is software created by a community of people who are dedicated to collaborating to produce true innovation and allow the evolution of new and better software". The UK Government defines the OSS is software development and allocation model where the software license guarantees certain freedoms of others (Service, U. G. P., 2011). By this definition, the organization owner of OSS has a free access and has permissions to modify a code to meet organization and users requirements. Through open source software usage, the way of software deployment, development and the perceived has been altered, and the adoption of OSS has been extended in much different type of organizations and individuals.

1.2 Problem Statement

In the literature, the concept of OSS adoption in organizations has debated in different trends. Firstly, Contribution the OSS project has been discussed by identifying of an individual developer's motivation (e.g., Roberts et al. 2006; Lakhani and Wolf 2003; Hann et al. 2002; Markus et al. 2000). Next, the organization and coordination of activities in an OSS development community has been demonstrated in many researches (e.g., Sharma et al. 2002; Jorgensen 2001; Koch and Schneider 2002).Finally Many articles has been compared between OSS and proprietary software, their several developmental patterns and the impact of the OSS developmental model on the traditional software industry (e.g., Comino and Manenti 2003). Moreover, the explanation of the open source software adoption in organizations was very short. Deeply, the models, theories and frameworks do not provide sufficient information about this phenomenon. Many articles in the literature illustrate the different factors that affect the OSS use, the main challenge is that there is no common between the OSS adoption in organizations and the adopting commercial software. Additionally, the risk is to change the organization elements and structure to meet the successful OSS implementation. However, all of these changes in the shape of organizations link to the success of OSS

implement. According to Marsan (2013), many factors can be decided the OSS adoption in organizations such external factors, organizational factors, and factors related to the OSS product itself and its alignment with the needs of the organization.

1.3 Objective and Contribution

The main purpose of this research is to explain how OOS can contribute the individuals and organization and demonstrate the expected benefits from OSS usage. Another important objective of this research is to determine if the OOS can be the tool in organization for reaching its goals and supporting the employees to perform their duties and functions. Accordingly, this research comes to investigate the factors that affecting the OSS adoption and usage. In more detail, it is very important to determine the factors affecting and motivate the users to use and reliance on the OSS for performing their tasks.

2. Theoretical Aspect and the Oos Model

2.1. Oos

In 1985, Richard Stallman was the founder of The Free Software Foundation in order to bolster the locomotion of free software which reinforces the international freedom to study, deploy, create, update, configure, and modify computer software through its own General Public License (Anjaneyulu, Biradar, Gopinath, & Naik, 2017). In last decade, the OSS has acquired unmatched publicity in private and public organizations. According to Alex (2015) Information technology is increasingly adopted by organizations for reaching many benefits such as developing solutions and alternative to dissolve the business problems, enhancing both the efficiency and effectiveness of the decision-making process, improving throughput and the presented service quality, having dynamic stability and sustainability, and strengthening to enter a new markets and having competition advantage. Like any information system, OSS works with several environments within organizations and institutions, executes also various functions for instance; operating systems, library management system, digital library / institutional repository, learning management system and content management (Hanumappa et al., 2014; Njoku, 2017).

The nature of E-learning concept is to appoint information technology paradigm as a framework for education purposes. A learning management system (LMS) considers as an application to improve education process in different aspects for the administration, documentation, tracking, reporting and delivery of E-learning courses or training programs (V. Agrawal et al, 2016). Meanwhile, An Educational Management Information System (EMIS) is as an integrated software within the several units of education organization. EMIS benefits the education institutes in many methods; for instance: producing, organizing, coordination and deploying the information and knowledge indoor of the organization and other stakeholders. Moreover, EMIS is a data warehouse which collects, process, analyze, coordinates and finalizes the information of education comprising students, teachers, staff, buildings and any attached to the institutions (L. Carrizo et al 2003; H. Hua, 2016). In 2010, Jordanian Government signed an agreement with Ingres Corporation (Action Corporation). This company pioneers in OSSs in the United States in order to hearten the OSS adoption in different sectors in Jordan (ITP.net, 2012). Consequently, Jordanian Education Ministry has embarked to apply the OSS which is called "Open-EMIS application" in 2017 to re-engineer the education process within Ministry.

2.2. An Integration of TAM and ISS Model

TAM -TAM was presented for measuring the acceptance level of users for information system. TAM gets started by suggesting the TAM construct into external factors. These factors affect the internal beliefs (perceived usefulness and ease of use). After, the attitude of use the technology and its acceptance can be gauged (Bagozzi, Davis, & Warshaw, 1992). TAM has been applied in many research in literature to reconnoiter the factors influencing the users and their attitude and tendency to work with new technology (Venkatesh & Davis, 2000).

TAM has been theorized and validated extensively in many studies. Self-efficacy, Perceived usefulness, Perceived ease of use and Intention to Adopt have been examined where the Structural Equation method (SEM) and Regression were applied to obtain the results (Wang, 2003; Abu-Shanab, 2014; Okunola, 2015; Alghamdi&Beloff, 2015; Wirtz et al. 2015). Moreover, Perceived usefulness , Perceived ease of use and

Intention to Adopt have been validated (Hu et al. 2009; Susanto&Aljoza,2015;Al-Hujran et al ,2015;AL-Athmay et al. 2016;Chelliah et al ,2016;Carter et al. ,2016).

ISS Model- Because the complex nature of IS and other reasons, IS success model has come to determine the factors affecting the successful information systems. Over the time, (DeLone & McLean, 2003) have sophisticated the IS success model with including six dimensions; namely: system quality, information quality, and service quality as external variables that influence the net benefit through the mediation variables which are intention to use/use and user satisfaction.

ISS has extensively been theorized and validated in antecedent's studies. System quality, Information quality, Service quality, Awareness/ publicity, User satisfaction and Usage Intention have been examined where the Structural Equation method (SEM) and Regression were applied to obtain the results (Illias et al. 2009; Alomari et al. 2014; Al-Soud et al. 2014; Okunola, 2015; Sobaci&Eryigit , 2015; Venkatesh et al. 2016; AL-Athmay et al. 2016)

Consequently, (Hossein Mohammadi, 2015) applied an integration of TAM and IS success model in his influential study. The scope of this study was e-learning technology. This study aimed at exploring the quality features (system, information and service), perceived usefulness on users' intentions and satisfaction, alongside the mediating effect of usability towards use of e-learning in Iran. Structural Equation Model (SEM) and path analysis were appointed to examine the study model. The overall results indicated that the factors had a positive effect toward e-learning usage.

2.3. Previous Related Studies

Basically, the main role of Management information systems is to transform the form of data from raw material shape into information to be employed in organization. The elevated quality of information assists organizations and institutions in different aspects; for instance, manage, enhance and coordinate their business processes, make a right decisions, and ameliorate organizational performance (Hasan,Y et al ,2013).

Al-mamary, Shamsuddin, and Aziati (2014) investigated research titled "Factors Affecting Successful Adoption of Management Information Systems in Organizations towards Enhancing Organizational Performance" .In this influential work, six dimensions were specified for determining the success of OOS adoption namely; system quality, information quality, use, user satisfaction, individual impact, and organizational impact . In addition to this study, there were many researches in literature that presented the measured items of information system for the impact and benefits of individuals and organizations such as staff reduction, overall productivity gains, increased revenues, increased sales, increased profits, increased work volume, product quality, and contribution to achieving goals etc. Moreover organizational performance is accumulated end results of all the organization's work processes and activities (Al-mamary et al., 2014b; Jean, Sinkovics, & Kim, 2008; Yunis, Tarhini, & Kassar, 2017). Moreover, (Al-mamary, Shamsuddin, & Aziati, 2014a) apply another items to measure the impact of information system on organizational performance such as productivity, efficiency, profitability, market value, competitive advantage, cost reduction, revenue enhancement, and overall organization performance. In addition to, Organization value of OOS has been elucidated in several methods such as productivity, efficiency, reliability, and security (Chengalur-smith et al, 2010).

2.4. The OOS Model and its Hypotheses

Linking to (TAM) and D&M updated model, this study employs an integrated model for assessment OOS success at Jordanian education ministry. Thus, nine dimensions were suggested for examining OOS success: perceived ease of use, perceived usefulness, training, service quality, information and system quality, intention to use/use, user satisfaction and net benefits. In the proposed model, it postulates that system quality, information quality , service and training quality of OOS are connected to intention to use/use and user satisfaction; perceived ease of use and usefulness are also affected the intention to use factors; and these in turn; influence intention to use and user satisfaction which effect on net benefits of OOS.

Perceived ease of use — Perceived ease of use can be known as the degree to which a user notarizes that learning to have a technology demands little effort. Perceived ease of use measures often count on easy to

learn; easy to manage; self-efficiency; simplicity; and compatibility (C. Yi et al, 2009; W. Wang, Y. Liu, 2009).

The effect of perceived ease of use has been revealed in many studies specifically in education context. In literature, it has been hypothesized that perceived ease of use has a positive effect on intention to use (Chen and Tseng, 2012; Chow, Herold, Choo, & Chan, 2012; Islam, 2013; Li et al., 2012). Meanwhile, perceived ease of use has indirect effect on intention to use through perceived usefulness (Chen and Tseng, 2012). Accordingly, this study supposes that:

H1: Perceived ease of use will significantly have a positive effect on employee's perceived usefulness Open- EMIS System both in pre and post-implementation phase.

H2: Perceived ease of use will significantly have a positive effect on employee's intention to use of Open- EMIS System both in pre and post-implementation phase.

Perceived usefulness — perceived usefulness can be known as user's perception that undergoes to apply their functions within use technology will ameliorate the performance and productivity. Perceived usefulness measures often count on performance; effectiveness; productivity; risk perception; and trust (C. Yi et al, 2009; M. Horst et al, 2007; W. Wang, Y. Liu, 2009).

The effect of Perceived usefulness has been revealed in many studies specifically in education context. In literature, it has been hypothesized that Perceived usefulness has a positive effect on intention to use (Chen and Tseng, 2012; Cheng, Wang, Moormann, Olaniran, & Cheng, 2012; Chow et al., 2012; Islam, 2012, 2013; Li et al., 2012; Liu et al., 2010; Sumak et al., 2011). Accordingly, this study supposes that:

H3: Perceived usefulness will significantly have a positive effect on employee's intention to use of Open- EMIS System both in pre and post-implementation phase.

Training — the high extremely success level of training dimension describes the successful information system implementation. Training measures often count on including training programs on the application; the clearance of training programs; users' role; availability of training material; and support (V. Aggelidis, P. Chatzoglou,2009; A. Al-Daihani,2006; E. Ngai at al,2004; M. Bradford, J. Florin,2003). Accordingly, this study argues that:

H4: Training will significantly have a positive effect on employee's intention to use of Open- EMIS System both in pre and post-implementation phase.

H5: Training will significantly have a positive effect on employee's Satisfaction of Open- EMIS System both in pre and post-implementation phase.

Service Quality — the effective success of service quality dimension symbolizes the quality of the support that the users extradite from the IT department of organization and IT support personnel. Service quality measures often count on responsiveness, accuracy, reliability, technical competence, and empathy of the IT personnel staff (Zaied, F. Khairalla, 2007; R. Connolly, F. Bannister, 2008).

The effect of service quality has been revealed in many studies specifically in education context. In literature, it has been hypothesized that service quality has a positive effect on both user satisfaction (Poulova and Simonova, 2014; Xu et al., 2014; Roca, Tajuddin et al., 2013) and intention to use (Cheng, 2012; Hassanzadeh et al., 2012; Li et al., 2012; Wang & Chiu, 2011). As result, this study supposes that:

H6: service quality will significantly have a positive effect on employee's intention to use of Open- EMIS System both in pre and post-implementation phase.

H7: service quality will significantly have a positive effect on employee's Satisfaction of Open- EMIS System both in pre and post-implementation phase.

System Quality — the effective success of systems quality dimension comprises the desirable characteristics of information systems and, thus, categories measures of the Information systems itself. System quality measures usually centralize in many aspects such as ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times (Liao et al,2007; C. Sohn, S. Tadisina,2008; Grigoroudis,2008;).

The effect of system quality has been revealed in many studies specifically in education context. In literature, it has been hypothesized that system quality has a positive effect on both user satisfaction (Alsabawy et al., 2013; Hassanzadeh et al., 2012; Islam, 2012; Kim et al., 2012; Motaghian et al., 2013; Wang & Chiu, 2011; Saba, 2013; Tajuddin et al., 2013; Rai, Acton, Golden, & Conboy, 2009) and intention to use (Cheng, 2012; Islam, 2012; Li et al., 2012; Ramayah et al., 2010; Wang & Chiu, 2011). As result, this study supposes that:

H8: systems quality will significantly have a positive effect on employee's intention to use of Open- EMIS System both in pre and post-implementation phase.

H9: systems quality will significantly have a positive effect on employee's Satisfaction of Open- EMIS System both in pre and post-implementation phase.

Information Quality — the high extremely success level of information quality dimension frames the desirable characteristics of an IS's outcome. Information quality typically depends on many classifications such as relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability (S. Swaid, R. Wigand, 2010).

The effect of information quality has been revealed in many studies specifically in education context. In literature, it has been hypothesized that information quality has a positive effect on both user satisfaction (Freeze et al., 2010; Mohammadi, 2015; Ramayaha et al., 2010) and intention to use (Bhuasiri et al., 2012; Lin, 2007; Mohammadi, 2015; Ramayah & Lee, 2012). As result, this study supposes that:

H10: information quality will significantly have a positive effect on employee's intention to use of Open-EMIS System both in pre and post-implementation phase.

H11: information quality will significantly have a positive effect on employee's Satisfaction of Open- EMIS System both in pre and post-implementation phase.

User Satisfaction — User satisfaction is theorized as one of the most paramount factors affecting of IS success. Reaching the high extremely success level of user satisfaction dimension frames the user's level of satisfaction when using an IS. User satisfaction measures often count on couple of the most widely used multi-attribute instruments for measuring user information satisfaction (G. Udo et al, 2008; G. Walsh, 2010; W. DeLone, E. McLean, 2004).

The effect of user satisfaction has been revealed in many studies specifically in education context. In literature, it has been hypothesized that user satisfaction has a positive effect on both user net benefits (Lin, 2007; Mohammadi, 2015) and intention to use (Mohammadi, 2015). As result, this study supposes that:

H12: User satisfaction will significantly have a positive effect on employee's intention to use of Open-EMIS System both in pre and post-implementation phase.

H13: User satisfaction will significantly have a positive effect on net benefits of Open- EMIS System both in pre and post-implementation phase.

Intention to Use/Use — Reaching the high extremely success level of intention to use/use dimension frames the degree and manner in which users and customers employ the capabilities of an information system. Intention to use/use measures often count on amount, frequency, nature, appropriateness, extent and purpose of use (M. Turner et al, 2010; V. Aggelidis, P. Chatzoglou, 2009).

The effect of intention to use has been revealed in many studies specifically in education context. In literature, it has been hypothesized that intention to use has a positive effect on net benefits (Lin, 2007; Mohammadi, 2015). As result, this study supposes that:

H14: intention to use/use will significantly have a positive effect on net benefits of Open-EMIS System both in pre and post-implementation phase.

Net benefits — reaching the high extremely success level of net benefits dimension frames the extent to which IS are giving a share in the success of the different stakeholders. Net benefits measures often count on improved decision-making, improved productivity, increased sales, cost reductions, improved profits,

market efficiency, consumer welfare, creation of jobs, and economic development(Gable et al.2008;Almutairi and Subramanian,2005;Iivari,2005)

Iivari, J. (2005). An empirical test of the Delone–Mclean model of information system success.

The DATA BASE for Advances in Information Systems, 26(2), 8–27

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According to aforementioned, The OOS proposed model and its hypotheses are completely justified by past studies in the IS literature. Thus, the present study can shape the model and its hypotheses, as follows:

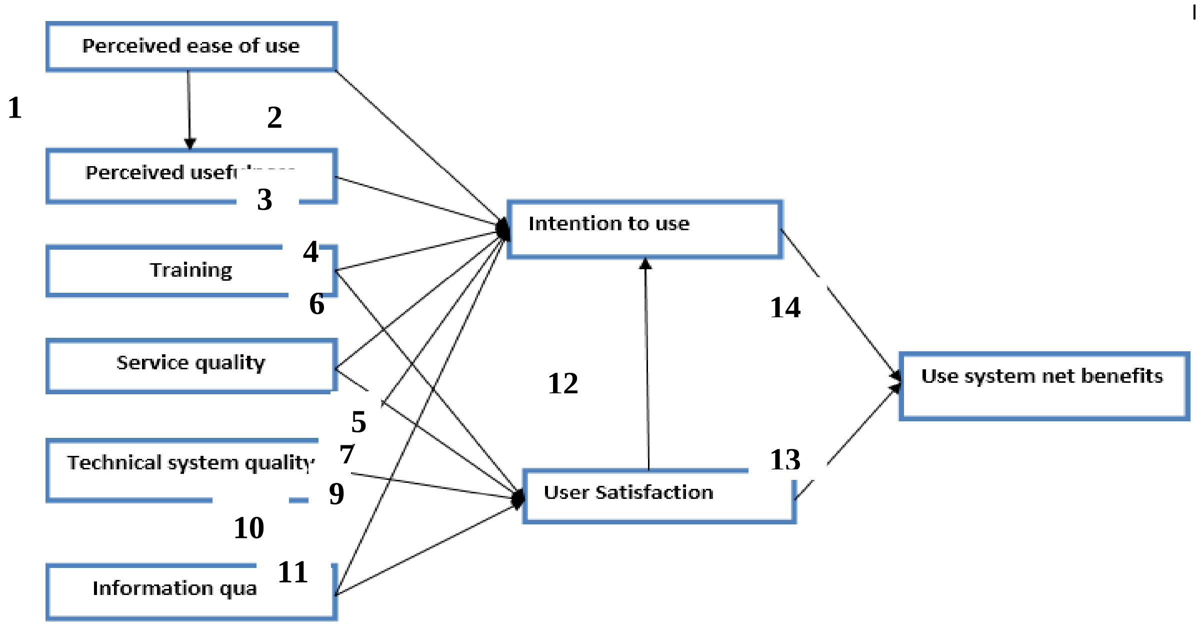

Figure 1: Conceptual research model

3. Research Methodology

3.1 Range of Study

This study embarked to use the proper approach for achieving the study goals and objectives which is a quantitative approach. The quantitative method has a capability at investigating the current study topic; because it has the ability for utilizing numerical method and statistical tools for gathering and analyzing data to obtain the accurate results. Focusing on the data of this research which would be acquired to examine the study objectives; the data could be categorized into two classes which are secondary and primary data.

The secondary data of this study point out of various sources which are obtainable from text books, Journals and magazines. The primary data refers to the data collected from first-hand experience that can be done via different techniques such as interview, case study method, questionnaires or observation of the new

phenomena. As abovementioned, this study employed the quantitative approach, the questionnaires were distributed to the chosen sample for getting the requisite data to examine the model and hypotheses of this study.

3.2 Instruments Measurement

Items options of this study instrument were ranked on a five-point Likert scale *(*1 = strongly disagree, 5=strongly agree*)*. The higher score refers to higher level of effecting use the current system.

For purposing of measures and developing the constructs proposed of this study, the prior validated measures were employed to reinforce the items of the current study constructs (Sugianto and Tojib, 2006). After reviewing and understanding the related constructs in the literature review, the items of current construct were developed and adapted based on declared literature.

Specifically, the construct of this study has 9 dimension. The first dimension is the training factor which has 5 items adopted from Venkatesh and Davis (1996). Service quality factor includes 4 items that adopted from Wang and Wang (2009) Au, Ngai, and Cheng (2008) Andrade and Bunker (2009) and Au et al. (2008). For measuring Technical System Quality, 6 items were adopted from instruments used Gable et al. (2008). To examine the Information Quality factor, 6 items were refined from the instruments utilized Au et al. (2008), Ho and Dzeng (2010), Wang and Wang (2009), Ozkan and Koseler (2009), Wang and Liao (2008) and Wang et al. (2007). In addition to, Perceived Ease of Use has 6 items from Davis et al. (1989). The Perceived Usefulness includes 8 items which adopted from Davis et al. (1989). For measuring the User Satisfaction factor, 4 items from the instruments were refined DeLone and McLean (2003), Lee (2010), Lee, Yoon, and Lee (2010). 5 items for examining the Intension of use factor in the instruments that adopted from Teo (2011), Ngai et al. (2007) and Lin and Hsieh (2007). Finally, the Net benefits factor has 5 items which refined and measured from instruments utilized Gable et al. (2008) and Iivari (2005).Full instrument items can be seen at Appendix A.

3.3 Sample Plan and Size

Basically, the nature meaning of sampling is to fetch information from a section of population. This process is to represent the whole population .So that, the main goal of sampling technique is to have the essential characteristics of population of targeted study as possible.

For many reasons engaged with researchers such as accessing the subjects easily, easy to handle, the cost issues and when the respondents are in house. Therefore, the convenience sampling technique was used for getting the sample size of current study population. The sample size of study was started with (450) participants who freely accepted to be a part of this study.

3.4 Data Collection and Time Frame

Because that the mother language of the population of this study is Arabic. The instruments items of this study were measured and developed in English Language, the items of instrument were moved into Arabic version by three experts in linguistic. The collected data were from the employees who use the Open-EMIS system at Jordanian Education Ministry. Before starting a data collection processes, this research was held a pilot study that proceed with 10 employees. The main conclusion results of pilot study is to discover the occult and mistakes of questions and correct them.

After making sure the questionnaire of current study came up with desired version, the questionnaires were disseminated to the sample through on-line survey. The researcher committed to distribute the questionnaires to the users by sending the survey link , these steps were performed in order to ensure that the respondents had a privacy and confident to fill the questionnaires without any consequences .This was achieved to minimize the potential threat of common method bias Podsakoff et al (2003).

In pretest phase (Oct, 2017), the returned questionnaires were (386) with (85.8) % rate of response. Due to missing data, (364) responses were just utilized for analysis purposes. Two month period of time was consumed to perform the data collection processes.

After one and half year, the employees of education ministry of Jordan worked through Open-EMIS system and completed their tasks. The posttest phase was launched, the returned questionnaires were (372**)** with

(82.7) % rate of response. Due to missing data, (330) responses were just utilized for analysis purposes. . Two month and half period of time was consumed to perform the data collection processes.

4. Results

Table 1 presents the demographic breakdown for the pre and post phases' sample of Jordanian Education Ministry employees. The valid sample size of pre and post –test were 364 and 330 respectively.

In term of Gender category in pre and posttest, the percentage of female was 73.6 and 72.4 whilst the remaining percentage was (26.4) and (27.6) respectively. Now coming to experience classification in pre and posttest, the percentage of the sample who have an experience work at Jordanian ministry of education that less than 5 years was (25.5) and (23.9) respectively; while, the percentage of the employees who fall down in the range between 5 to 10 was (25.8) and (25.8) respectively; while , the percentage of the employees who fall down in the range between 10 to 15 was (26.6) and (27.3) respectively and the percentage of others who worked for 15 years and above was (22.0) and (23.0) respectively. In pattern of qualifications characteristic in pre and posttest, the percentage of the respondents who have diplomas (before BA degree) was (15.4) and (15.5) respectively; while, the percentage of the respondents who have bachelor's degrees was (57.1) and (56.4) respectively ;while, the percentage of the respondents who have diplomas (After BA degree) was (17.9) and (18.5) respectively; while, the percentage of the respondents who have Master degrees was (8.2) and (8.2) respectively ; and the percentage of remaining who have PhD degrees was (1.4) and (1.5) respectively. Now coming to Job title classification in pre and posttest, the percentage of the respondents who have Administrative job was (22.0) and (22.4) respectively; while, the percentage of the respondents who work as a teacher was (67.9) and (66.7) respectively; while, the percentage of the respondents who work as a School manager was (7.7) and (8.2) respectively and the reset percentage who work as Supervisor was (2.5) and (2.7) respectively.

Table 1: Respondent's Demographic data for pre and post test

Demographic characteristic		**Pretest (N=364)**		**posttest (N=330)**	
		FREQ	**(%)**	**FREQ**	**(%)**
GENDER	**Male**	96	26.4	91	27.6
	Female	268	73.6	239	72.4
EXPERIENCE	**Less than 5**	93	25.5	79	23.9
	Between 5 to 10	94	25.8	85	25.8
	Between 10 to 15	97	26.6	90	27.3
	More than 15	80	22.0	76	23.0
QUALIFICATIONS	**Diploma**	56	15.4	51	15.5
	BA	208	57.1	186	56.4
	High diploma	65	17.9	61	18.5
	Masters	30	8.2	27	8.2
	PhD	5	1.4	5	1.5
Job Title	**Administrative**	80	22.0	74	22.4
	Teacher	247	67.9	220	66.7
	School Manager	28	7.7	27	8.2
	Supervisor	9	2.5	9	2.7

To achieve some matters such dimensionality, convergent and discriminant validity, confirmatory factor analysis (CFA) was applied. More clarify, the model that be renewed the proposed variables of this study. Table 2 and 3 offer actual measurement model values for the different fit indicators. . In the current study, GFI comes to be maximum fit when the value equal 1 (Tanaka & Huba, 1985); NFI and TLI come to be maximum fit when the value equal 1 (Bentler & Bonett, 1980); , CFI comes to be maximum fit when the value equal 1 (McDonald & Marsh, 1990) ; RMR comes to be maximum fit when the value less than .06 (Browne & Cudeck, 1993) and CMIN/DF comes to be maximum fit when the value more than 1 and less than 5 (Marsh & Hocevar, 1985). As a result, all the fits for the nine item model were agreeable as evident in table 2. Where the table 3 gives the measurement the potential threats of CMV that does not seems to exist.

Table 2: Nine fix model in pre and post test

Goodness-of-fit- indices	**pre-test**	**post-test**
Chi-square (X2)= 1628.052 df =629, p<0.000	2292.244,df=744 ,P<0.000	Chi-square(X2) =
GFI 0.796		0.697
NFI 0.895		0.873
CFI 0.935		0.910
TLI 0.925		0.901
RMSEA	0.076	0.069
CMIN/DF	3.081	2.588
Note: full abbreviations in appendix B.		

Table3: One fit model in pre-test and post test

Goodness-of-fit- indices	**pre-test**	**post-test**
Chi-square (X2) , df=689, p<0.000	3140.911,df=764 ,P<0.000	Chi-square(X2) = 2704
GFI	0.779	0.645
NFI	0.822	0.833
CFI	0.862	0.870
TLI	0.852	0.860
RMSEA	0.093	0.094
CMIN/DF	4.115	3.926
Note: full abbreviations in appendix B.		

Next step of current study analysis, to evaluate and estimate the normality and skewness of the responses, the mean and standard deviation of the measures were produced. As can be seen from table 4 and 5, the data of this study appears to distribute normally depending on the mean and standard deviation values.

Table 4: Descriptive analysis of the pre-test

Construct	**Mean**	**SD**	**Construct items loaded**
Training Factors	2.85	1.19	**T2** **T3** **T4** **T5**
Service Quality	3.12	1.12	**SQ1** **SQ2** **SQ4**
Technical System Quality	3.21	1.09	**TSQ1** **TQS2** **TQS3** **TQS4** **TQS5** **TQS6**
Information Quality	3.29	1.04	**IQ1** **IQ2** **IQ3** **IQ4** **IQ6**
Perceived ease of use	3.30	1.13	**PEU1** **PEU2** **PEU3** **PEU4** **PEU6**
Perceived usefulness	3.21	1.12	**PU1** **PU3** **PU4** **PU5** **PU6** **PU8**
User Satisfaction	3.12	1.15	**US1** **US2** **US3** **US6**
Intention to use	3.24	1.14	**IU1** **IU2** **IU3** **IU5**

Use System net Benefits	3.21	1.09	**NB1** **NB2**. **NB3** **NB4**

Table 5: Descriptive analysis of the post-test

Construct	**Mean**	**SD**	**Construct items**
Training Factors	2.93	1.17	**T3** **T4** **T5**
Service Quality	2.99	1.09	**SQ1** **SQ3** **SQ4**
Technical System Quality	3.27	1.11	**TSQ1** **TQS3** **TQS4** **TQS5** **TQS6**
Information Quality	3.34	1.06	**IQ1** **IQ3** **IQ5** **IQ6**
Perceived ease of use	3.45	1.06	**PEU1** **PEU2** **PEU3** **PEU4** **PEU6**
Perceived usefulness	3.24	1.1	**PU2** **PU3** **PU4** **PU5** **PU6** **PU8**
User Satisfaction	3.05	1.2	**US1** **US3**. **US4** **US5** **US6**
Intention to use	3.18	1.13	**IU1** **IU3** **IU4** **IU5**
Use System net Benefits	3.09	1.12	**NB1** **NB3**

			NB4

In pre-implementation and post – implementation phases, KMO Measure of sampling adequacy is equal to 0.972 and 0.975 respectively; above the cut-off point of .70, in similar fashion Bartletts'Test of Sphericity value is equal to 17394.32 with a degree of freedom equals to 820 and 14863.11 with a degree of freedom equals to 703 respectively, and the p-value of the research study sample indicated to be significant. As a results from table 6, this offered for us a strong baseline and trust to continue with current research analysis.

Due to CFA some items were deleted in pre and post construction. Cronbach's alpha values were more than benchmark of .60; in like manner CR and AVE were also more than benchmark of .70 and .50 as suggested by (Hair et al., 2006). Fornell and Larcker (1981) proposed that if AVE < .05, but the CR is > 0.6, this signalizes that the convergent validity of the construct is still acceptable. Relay on recent consequence, the constructs convergent validity is not seem to be influenced .Finally, convergent and discriminant validity of the study constructs are obviously presented

Table 6: Psychometrics properties of the measures (Pre-post implementation)

	Pretest			**Posttest**		
Factors	***α***	**CR**	**AVE**	***α***	**CR**	**AVE**
Training Factors	0.925	0.698	0.367	0.915	0.915	0.783
Service Quality	0.846	0.783	0.547	0.869	0.690	0.870
Technical System Quality	0.922	0.791	0.584	0.903	0.859	0.659
Information Quality	0.925	0.830	0.605	0.920	0.92**3**	0.749
Perceived ease of use	0.910	0.826	0.595	0.915	0.873	0.682
Perceived usefulness	0.951	0.872	0.723	0.960	0.916	0.803
User Satisfaction	0.932	0.909	0.714	0.955	0.932	0.811
Intention to use	0.962	0.911	0.718	0.951	0.952	0.833
Use System net Benefits	0.932	0.896	0.684	0.934	0.935	0.827
Note: full abbreviations in appendix B. **Pretest: KMO = 0.972, Bartlett's Test of Sphericity = 17394.32, df = 820, P=0.000.** **posttest: KMO = 0.975, Bartlett's Test of Sphericity = 14863.11, df = 703 , P=0.000**						

The figures 2 and 3 present the structural equation model that obtained from the AMOS software both in pre and post – test; in order to examine the hypothesis of current study. The strength of the relationship between the independent and dependent variables of current study was gauged, as can be seen in table 7.

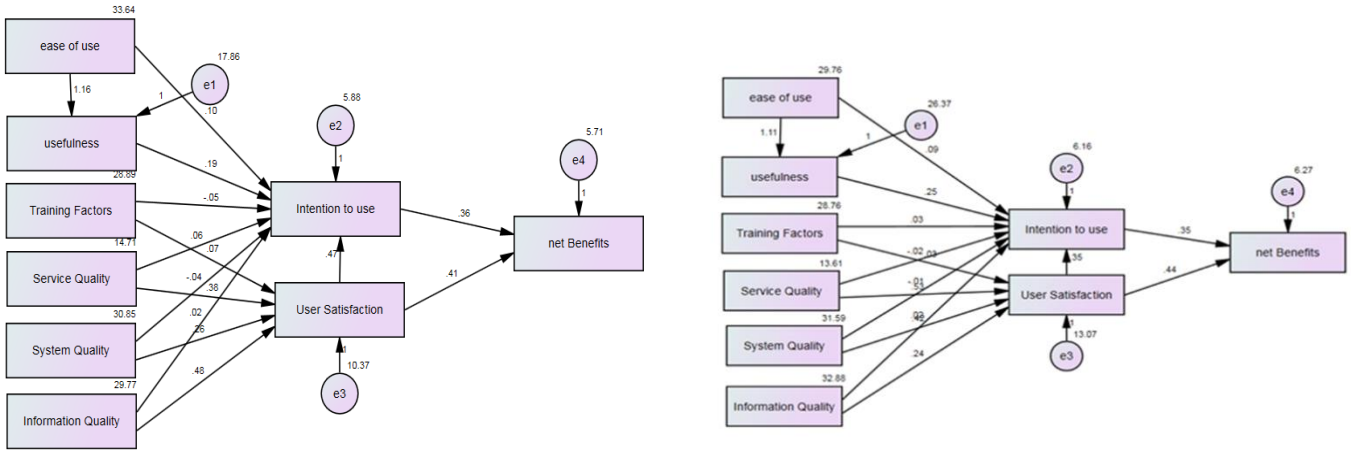

Figure2 : Pre- test *Figure3 : Post-test*

Table 7: Maximum Likelihood of Pretest and posttest

Independent Variables	dependent Variables	Coefficient Estimates		Standard Error		T-statistics		P	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Ease	Usefulness	1.156	1.109	0.038	0.052	-25.975	21.372	***	***
Ease	Intention	0.101	0.095	0.041	0.039	18.558	2.442	0.014	0.015
usefulness	Intention	0.192	0.247	0.03	0.027	40.352	9.28	***	***
Training	Satisfaction	0.073	0.028	0.031	0.037	-16.027	0.753	0.021	0.452
Training	Intention	-0.05	0.034	0.024	0.026	-7.511	1.328	0.037	0.184
Service	Satisfaction	0.382	0.531	0.044	0.054	-29.749	9.818	***	***
Service	Intention	0.059	-0.021	0.036	0.042	-20.585	-0.496	0.107	0.62
Technical	Satisfaction	0.258	0.415	0.03	0.035	3.251	11.712	***	***
Technical	Intention	-0.038	-0.011	0.025	0.029	15.181	-0.386	0.134	0.699
Information	Satisfaction	0.477	0.24	0.031	0.035	5.877	6.903	***	***
Information	Intention	0.016	0.02	0.03	0.026	18.307	0.778	0.587	0.437
Satisfaction	Intention	0.47	0.353	0.04	0.038	15.029	9.323	***	***
Satisfaction	Benefits	0.405	0.444	0.033	0.031	15.204	14.188	***	***
Intention	Benefits	0.362	0.352	0.039	0.04	1.244	8.78	***	***
Notes: ***Significant at the p < 0.05 level (two-tailed); **significant at the p < 0.01 level (two-tailed)**									

The results presented in table 7 confirmed that Perceived ease of use has a direct positive effect on employee's perceived usefulness Open- EMIS System in two test waves (pre and post); [**H1** gained support].The results also show that Perceived usefulness has a direct positive effect on employee's intention to use of Open- EMIS System in two test waves (pre and post); [**H3** gained support]. The result also depict that service quality has a direct positive effect on employee's Satisfaction of Open- EMIS System in two test waves (pre and post); [**H7** gained support]. The result also depict that systems quality has a direct positive effect on employee's Satisfaction of Open- EMIS System in two test waves (pre and post); [**H9** gained support]. The results confirm that information quality has direct and significant effect on employee's Satisfaction of Open- EMIS System both in pre and post-implementation phase (**H11** gained support). The

results of current study confirm that User satisfaction has direct and significant effect on employee's intention to use of Open- EMIS System both in pre and post-implementation phase (**H12** gained support).

The table 7 also presents that User satisfaction has a direct positive effect on net benefits of Open- EMIS System both in pre and post-implementation phase (**H13**gained support). The result also depict that intention to use/use has a direct positive effect on net benefits of Open- EMIS System both in pre and post-implementation phase **(H14**gained support).

In order to have a comprehensive view about the results in pre and post-test, the coefficients and t-statistics were harnessed. As can be observed from table 9, there is no vary significantly of the strength of the relationship between the proposed variables. Accordingly, this gives a robust for the findings of current study in pre and post-test.

Table 9: Comparison of control and experiment sample

Independent Variables	**dependent Variables**	**β (t) Control sample (pretest) (posttest)**	**β (t) experiment sample**
Ease	usefulness	1.156 1.109(21.372)	(-25.975)
Ease	Intention	0.101(18.558)	0.095(2.442)
usefulness	Intention	0.192(40.352)	0.247(9.28)
Training	Satisfaction	0.073(-16.027)	0.028(0.753)
Training	Intention	-0.05(-7.511)	0.034(1.328)
Service	Satisfaction	0.382(-29.749)	0.531(9.818)
Service	Intention	0.059(-20.585)	-0.021(0.496)
Technical	Satisfaction	0.258(3.251)	0.415(11.712)
Technical	Intention	-0.038(15.181)	-0.011(-0.386)
Information	Satisfaction	0.477(5.877)	0.24(6.903)
Information	Intention	0.016(18.307)	0.02(0.778)
Satisfaction	Intention	0.47(15.029)	0.353(9.323)
Satisfaction	Benefits	0.405(15.204)	0.444(14.188)
Intention	Benefits	0.362(1.244)	0.352(8.78)

5. Discussion and Conclusion

The main purpose of this research work was to validate a model that tries to get better understanding about the determinants of Net benefits for OSS representative by Open-EMIS system in Education Ministry of Jordan in LMS Context.

First, as theorized by an integration of TAM and ISS model Perceived ease of use was discovered to gain a positive and significant harmonize with perceived usefulness Open- EMIS System in two test waves (pre and post) , this is linked to (Chen and Tseng, 2012).Additionally, Perceived usefulness was revealed to gain a positive and significant harmonize with intention to use of Open- EMIS System in two test waves (pre and post) , this is linked to (Chen and Tseng, 2012; Cheng, Wang, Moormann, Olaniran, & Cheng, 2012;

Chow et al., 2012; Islam, 2012, 2013; Li et al., 2012; Liu et al., 2010; Sumak et al., 2011).Moreover, Service quality was disclosed to gain a positive and significant harmonize with Satisfaction of Open- EMIS System in two test waves (pre and post) , this is linked to satisfaction (Poulova and Simonova, 2014; Xu et al., 2014; Roca, Tajuddin et al., 2013). Furthermore, Systems quality was uncovered to gain a positive and significant harmonize with Satisfaction of Open- EMIS System in two test waves (pre and post), this is linked to (Alsabawy et al., 2013; Hassanzadeh et al., 2012; Islam, 2012; Kim et al., 2012; Motaghian et al., 2013; Wang & Chiu, 2011; Saba, 2013; Tajuddin et al., 2013; Rai, Acton, Golden, & Conboy, 2009).Further, Information quality was revealed to gain a positive and significant harmonize with Satisfaction of Open- EMIS System in two test waves (pre and post) , this is linked to(Freeze et al., 2010; Mohammadi, 2015; Ramayaha et al., 2010).Next, User satisfaction was discovered to gain a positive and significant harmonize with intention to use of Open- EMIS System in two test waves (pre and post) , this is linked to (Mohammadi, 2015).Additionally, User satisfaction was discovered to gain a positive and significant harmonize with net benefits of Open- EMIS System in two test waves (pre and post) , this is linked to (Lin, 2007; Mohammadi, 2015).Finally, Intention to use/use was uncovered to gain a positive and significant harmonize with net benefits of Open- EMIS System in two test waves (pre and post) , this is linked to (Lin, 2007; Mohammadi, 2015).

The results of current study show that Training factor did not affect User satisfaction of open-EMIS system both in pre and post folds. Moreover, Perceived ease of use, perceived usefulness Training factor, Service quality and System quality did not have a significant effect Intention to use of Open- EMIS system both in pre and folds. According to this results, this might motivate the Education Ministry of Jordan to reconsider these factors and take them in place to be studied accurately.

This study recommends that there is a need to apply many researches to examine the presented findings of current study with maximizing the sample size. The trend of future works with a longitudinal approach will be welcomed to deeply understand the factors affecting OOS.

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APPENDIX: A

Constructs	Survey items
Training Factor	**T1**: The kind of training provided to me was complete. **T2:** My level of understanding was substantially improved after going through the training program**.** **T3:** The training gave me confidence in the OpenEMIS system**.** **T4:** The training on the OpenEMIS system was of adequate length and detail**.** **T5:** The trainers were knowledgeable and aided me in my understanding of the OpenEMIS system**.**
Service quality	**SQ1:**OpenEMIS system provides a proper online assistance and explanation. **SQ2:** OpenEMIS system department staff responds in a cooperative manner**.** **SQ3:** OpenEMIS system provides me with the opportunity of reflecting views**.** **SQ4:** OpenEMIS system provides me with courses management**.**
Technical system quality	**TSQ1:** OpenEMIS system allows information to be readily accessible to me. **TQS2:** OpenEMIS system makes information very accessible. **TQS3:** OpenEMIS system always does what it should. **TQS4:**OpenEMIS system user interface can be easily adapted to one's personal approach. **TQS5:** All data within OpenEMIS system is fully integrated and consistent. **TQS6:** OpenEMIS system can be easily modified, corrected or improved.

Information quality	**IQ1:** OpenEMIS system provides information that is relevant to my needs. **IQ2:** OpenEMIS system provides comprehensive information. **IQ3:** OpenEMIS system provides information that is exactly what I want**.** **IQ4:** OpenEMIS system provides me with organized content and information. **IQ5:** OpenEMIS system provides up to date content and information. **IQ6:** OpenEMIS system provides required content and information**.**
Perceived ease of use	**PEU1:** It is easy for me to integrate the functions of OpenEMIS system with my teaching plan**.** **PEU2:** It is easy for me to become skilled at using OpenEMIS system**.** **PEU3:**OpenEMIS system is easy to use **PEU4:** I find it easy to get OpenEMIS system to do what I want it to do corresponding to the ways I teach**.** **PEU5:** It is easy for me to understand how to perform tasks using OpenEMIS system**.** **PEU6:** It is easy for me to recover from errors encountered while using OpenEMIS system.
Perceived usefulness	**PU1:** Using OpenEMIS system improves my teaching. **PU2:** Using OpenEMIS system improves my working efficiency**.** **PU3:** Using OpenEMIS system enhances my interactions with the students**.** **PU4:** Using OpenEMIS system can help students enhance their learning effectiveness. **PU5:** Using OpenEMIS system saves me time**.** **PU6:** Using OpenEMIS system gives me greater control over my work **PU7:** Using OpenEMIS system increases the reuse rate of the course materials**.** **PU8:** Overall, I find OpenEMIS system useful in my job**.**
User Satisfaction	**US1:** OpenEMIS system is enjoyable. **US2:** I am pleased enough with OpenEMIS system**.** **US3:** The OpenEMIS system satisfies my functional needs. **US4:** I am satisfied with performance of OpenEMIS system. **US5:**The OpenEMIS system is pleasant to me. **US6:** The OpenEMIS system give me self-confidence
Intention to use	**IU1:** I intend to use/reuse OpenEMIS system in the future. **IU2:** I plan to use/reuse OpenEMIS system in the future. **IU3:** I expect that I would use/reuse OpenEMIS system in the future. **IU4:** I would use OpenEMIS system to perform different functional activities. **IU5:** I would add OpenEMIS system to my favourite list

Use system net benefits	**NB1:** The OpenEMIS system enhances my awareness and recall of job related information. **NB2:** The OpenEMIS system enhances my effectiveness in the job. **NB3:** The OpenEMIS system is cost effective. **NB4:** The OpenEMIS system has resulted in overall productivity improvement. **NB5:** The OpenEMIS system has resulted in improved business processes.

Appendix B. Abbreviations list

Abbreviation	Expression
df	degree of freedom
GFI	goodness-of-fit indices
NFI	Normed Fit Index
CFI	comparative fit index
TLI	Tucker-Lewis index
RMSEA	root mean square error of approximation
CMIN/DF	Relative Chi-square
CR	construct reliability
AVE	average variance extracted
α	Cronbach's alpha