

Extending the Information Systems Success Model with Transformational Leadership and Compatibility

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Abstract

The proven competency of online learning has made it an integral means of learning. Notably, with minimum resources and infrastructure, online learning improves education quality. Online learning adoption and usage have been scrutinized in diverse settings. Somehow, in Jordan, the impact of compatibility and Transformational Leadership (TL) has not been sufficiently explored. Hence, in predicting students' performance, this paper presents the application of the Information System (IS) success Model from DeLone and McLean, incorporating the concepts of compatibility and TL as predecessors to user contentment and actual usage. The primary data were obtained from 448 students from 9 state-funded Jordanian universities through the application of questionnaire. A framework comprising 6 variables was proposed in this cross-sectional study and the data analyses point to 3 major outcomes. First, the whole quality, comprising the system, data, and service quality, compatibility and TL positively impact user satisfaction and actual use. Secondly, user satisfaction is notably predicted by actual use. Thirdly, there is positive effect of user satisfaction and actual use on students' performance. Students from 9 state funded universities made up the study population and the variables were examined at a single time point. The experience gained in online learning application would change students' opinions. However, a cross-sectional study like the present study may not detect such change. Through combining the general quality, TL, compatibility, actual use and client satisfaction to appraise the impact of online learning amongst students in 9 Jordanian universities, this study finding reinforces past findings on information systems.

Keywords: DeLone and McLean model, Leadership, Partial least squares, Empirical study, E-learning, M-learning, Jordanian universities.

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I. Introduction

Online learning involves the use of communication and information technology in education, and online learning has been examined rather comprehensively. Notably, various comparable terms have been associated with online learning ever since its initiation, for instance, the terms “e-learning,” “distance learning” and “blended learning.” Essentially, online learning delivers the directives via the web through the application of digital gadgets including tablets, smart phones desktops and laptops. Governments globally are positioning online learning in the endorsement of technology in the arena of education [1, 2].

In the context of Jordanian universities, there have been upsetting challenges in the industry of education, whereby the Global Competitiveness Report (2017) reported that from 126 countries, Jordan is at 106th place in terms of the rate of tertiary education enrolment. In addition, gender disparity in tertiary admissions also exists in the country [3]. As reported in Jordanian Educational Indicators (2015), in state-funded universities, admissions of female students appear to fall behind those of male by 50% [4]. Accordingly, through the expansion of the span and parity of education, the role played by online learning is significant in dealing with such obstacles.

Being in the midst of terrible civil war, has exacerbated the problem even more for Jordan, as it adversely affects the structures and streets of the university. Also, since it is quick and simpler to re-establish technology infrastructure particularly the mobile usage, online learning can be deemed a perfect answer for learners in territories that have been plagued with crisis. Hence, within the strife-prone territories, the application of online learning can curb the distraction of the educational practice [5].

In the context of information systems (IS), there are diverse constructed and proposed models and theories in the estimation and description of user behaviour towards technology. Among the proposed models include the DeLone and McLean model of information systems success (DMISM) [6], PC utilisation model, and technology acceptance model, while the popularly employed theories include diffusion of innovation theory, theory of planned behaviour, theory of reasoned action, and Unified Theory of Acceptance and Use of Technology (UTAUT) [7]. Moreover, the adoption and usage of first-hand technological advancements have been empirically scrutinized in a comprehensive manner by past studies, but IT utilisation has not been sufficiently evaluated. Usage of IT has been evaluated by DMISM through the examination of the impact of the total quality (data, system and service quality) on the satisfaction of client and actual use [8]. This would affect performance. Notably, IT success is now measured primarily using this method.

Significant power distance can be observed in Jordan whereby hierarchical arrangement and centralisation is an accepted norm. Meanwhile, in the usage of IS, leadership is deemed a vital expediter. The development of leadership has in fact been mentioned in the Critical Human Capital Issues Report (2014) as among the leading concerns among high performing bodies. In current IS studies, transformational leadership (TL) is viewed as an indispensable aspect [9].

As a nation, Jordan has a low level of individualism whereby the impact of relationships and society is both high and strong, implying that the adoption and usage of new technology have to be compatible with the principles, convictions and social standards of user. Somehow, among some studies, the ability of online learning in improving performance has not been affirmed [10, 11]. Equally, the weak impact of online learning on performance of students has been reported and

such finding may be factored by other aspects including compatibility.

Jordan is made up of 21 provinces, and out of these, only 9 provinces have state-funded university each, which means that the remaining 12 provinces do not have any state-funded university [12]. This opens up the potential of providing online learning by the Jordanian government in areas without a state-funded university so that all provinces and remote zones can have access to education. The Jordanian government has hence introduced The Jordanian government has hence introduced the Jordan Centre for Information Technology in Higher Education (JCIT-HE), with the power to endorse IT services in the Jordanian public higher education bodies. Among Jordanian students in state-funded universities, there appears to be a high level of awareness of the IT function in the arena of education [13].

In Jordan, there have been substantial challenges in the assimilation of conventional and online learning, and these challenges involve the social, technical and social elements. However, the fact that the majority of relevant works utilizing DMISM were performed in Western nations should not be ignored. In fact, online learning in the situation of Jordan that embraces a highly distinct culture has not been sufficiently examined [14]. Hence, the present paper will bridge this gap through the application of DMISM expanded with two integrated and critical precursors, namely compatibility and TL, in examining user satisfaction and actual usage. This study would be of value in assisting both policy makers and universities in Jordan in dealing with the challenges faced within the field of higher education in the country [15].

II. Theoretical framework

2.1 Overall Quality (QUL)

The intensifying complications and progressions in the IS field have compelled both the experts and researchers to improve the efficacy and quality of the new frameworks. In this regard, the overall quality which includes information, service and data quality is considered as a second-order construct. From the obtained results, it is clear that the actual use of IS, user satisfaction and quality are significantly related. Meanwhile, user satisfaction is impacted by the overall quality, whereas quality of technology appears to impact the actual use.

Relevantly, system quality encompasses how far a system user is confident that a given system is handy for usage, simple to grasp, master and connect, and enjoyable. In both technology usage and user satisfaction, system quality is considered the primary precursor. Notably, it affects user satisfaction significantly, and affects actual use as well. On the other hand, service quality is associated with dependability, tangibles, receptiveness, surety, empathy, usefulness and interactivity. Additionally, a significant impact of service quality on contentment and actual use has been reported. Quality of information is the degree to which a given system's users are sure that the online learning information has accuracy, while being current, apposite, all-inclusive, and orderly. Quality of information is indeed a crucial aspect which dictates both contentment and actual use. Among academics, the notable impact of quality of information on user satisfaction and actual use has been recognised. The hypotheses below are hence proposed:

H1. Overall quality significantly impacts user satisfaction.

H2. Overall quality significantly impacts actual usage of online learning.

2.2 Transformational Leadership

In the examination of IS success and adoption of technology, the function of TL appears to be increasingly integral. TL would generally boost the followers to aim higher in order to fulfil their self-realising needs. Accordingly, there are 4 core aspects associated with TL as follows: appeal, individual contemplation, intellectual encouragement and inspirational impetus. In IS field, success in online learning in universities can be attained through the provision of support, tutoring and facilities by the management. Providing students with favourable online learning experience can increase the effectiveness of online learning.

As reported in several past works, TL has gradually transformed into a critical element in the enhancement of individual performance. Somehow, owing to its impact on diverse settings including IS and education, TL has proven its prominence. The significant role played by TL in online learning in the context of higher education has been affirmed. In online learning context, this study view the role of TL as integral, allowing lecturers to empower, motivate and stimulate students to employ superior approaches to online learning while also recognising their efforts in the technology employment. At the same time, online learning is usable among lecturers as a teaching and communication method in the execution of leadership skills.

The need to take into account the effect imparted by leadership on the adoption and usage of novel technologies is increasingly recognised, as many past studies have reported a significant effect of leadership on innovation practices. Considering that TL is explorative in general, it is relevant in the novel technology adoption. There is a positive link between TL and satisfaction, and the effect of TL on system success is considerable, and this has evidently led to the effective usage of

a system. The hypotheses below are hence proposed:

H3. TL significantly impacts user satisfaction.

H4. TL significantly impacts actual usage of online learning.

2.3 Compatibility (CMP)

Compatibility encompasses the degree to which an innovation is viewed as corresponding with the prevalent ideals, needs and preceding experiences of future adopters. Compatibility in the IS field is regarded as a core precursor for the adoption of user of new application or technology, and in the innovation adoption, compatibility a primary indicator. However, this aspect has been rather overlooked in the internet and education studies. High level of compatibility would improve the usage of mobile systems. Compatibility in this study is defined as the level to which the technology of online learning technology corresponds to the students in terms of their ideals, convictions, and ways of life. Satisfaction is significantly affected by compatibility, and in a study carried out in Taiwan on mobile education, a weighty relationship was reported between compatibility and utilisation. The hypotheses below are hence proposed:

H5. Compatibility significantly impacts user satisfaction.

H6. Compatibility significantly impacts actual usage of online learning.

2.4 Actual Usage (USE)

Actual use refers to the degree to which certain individual employs IS capacities, particularly in terms of repetition, nature and extent. Within the context of online learning, actual use further reflects usage particularly in terms of the extent and frequency. Also, in the use of technology, it is important to perform evaluation on the effect of system use on the success aspects of IS, for

instance, performance. The effect of actual use on both satisfaction and performance has been examined in several studies, and the results have been inconclusive. Nonetheless, a notable linkage between actual use and performance and satisfaction has been affirmed. An insignificant link between the constructs was equally reported. Notably, the present study attempts to look into the effect of actual use on satisfaction. The hypotheses below are hence proposed:

H7. Actual usage significantly impacts user satisfaction.

H8. Actual usage significantly impacts performance impact.

2.5 User Satisfaction (SAT)

User satisfaction which relates to the level to which a system is viewed by customer as accommodating and would be used again, is a key determinant in the evaluation of success of new system adoption. Hence, the utilization of user satisfaction as an indicator in the field of IS appears to be expansive. User satisfaction denotes the satisfaction of user towards the speed and quality of the system, the number of functions and the design. Equally, it can refer to the extent to which students are satisfied with their decision to use online learning based on how well the system satisfies their expectations. As reported in several past studies, performance is impacted by user satisfaction in diverse contexts and technology uses. For example, user satisfaction considerably impacted the effect of performance similar significant relation between user satisfaction and clear benefits. Conversely, insignificant relation between user satisfaction and effect of performance. The hypotheses below are hence proposed:

H9. User satisfaction significantly impacts performance.

2.6 Performance Impact (PI)

In examining the aspects that impact the adoption of certain technology systems, intent to use or actual use has been employed by IS scholars as the dependent variable. Somehow, with the technological progression and the introduction of diverse new systems, the emphasis has shifted to the outcomes of the use of system particularly in terms of performance improvement. This would allow the evaluation and measurement of efficacy of the system. Pertinently, performance effect relates to the level to which system use intensifies work quality through speeding up the task accomplishment, allowing command over work, improving job performance, eradicating mistakes and stimulating efficiency at work. The present study accordingly describes performance as the level to which online learning impacts students' performance particularly in terms of saving of resources, efficiency, competency and knowledge achievement.

III. Study methodology

3.1 Research framework

The hypothesised variable factors in the present study and their connections in the framework were acquired from past studies. These variables were used in the models and hypotheses in past works. Figure 1 displays the extended recommended framework. The framework shows that overall quality (system, service and information quality) impacts user satisfaction and actual use and project performance effect as well. The recommended framework explores the link between overall quality, TL and compatibility. Overall quality, TL, and compatibility are the antecedent factors to user satisfaction and actual use. This also elucidates the impact of performance that functions as an output variable amid the examined Jordanian students who utilized or are still utilizing online learning. As previously

presented, nine hypotheses were to be tested in this study.

3.2 Study measurements

This study employed a survey method with the use of questionnaire comprising 33 items with Likert scale to measure the variable factors. The items were based on the past relevant IS literature. The Likert scales used were in two types namely the 7-point (7 means “strongly agree” and 1 means “strongly disagree”) and the 5-point scales. Notably, the 5-point scale was used for the construct of actual use only. In this study, the respondents were all native Arab speakers and for this reason, the questionnaire was translated from English language to Arabic in order to ease the data gathering process.

3.3 Data collection

The in-person self-administered questionnaire was the method used in obtaining the data in this study, and the data were gathered from October 2016 to April 2017. The respondents chosen in this study were those students enrolled in 9 state-funded Jordanian universities, and these students had used or were utilizing online learning. A total of 464 sets of questionnaire were returned from the 800 distributed sets of questionnaire, and finally, 448 sets of questionnaire were determined as usable for analysis.

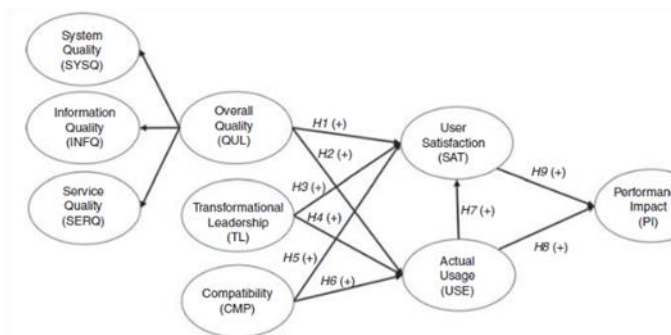


Figure 1: The proposed integrated framework

IV. Study results

Variance-based structural equation modelling, partial least squares (PLS) methodology and the SmartPLS 3.0 software were employed in the present study in the research model analyses. There were two stages involved in the analysis, where the first one involved the performance of assessment of the measurement model, while the second one involved the performance of assessment of the structural model. PLS has been chosen in the present paper as a statistical approach because this approach simultaneously analyses the measurement and structural model, and therefore, the estimates are more precise.

The assessment of the measurement model includes the determination of construct reliability and validity (convergent and discriminant validity). Then, in the determination of dependability of each key parameter in the model (construct reliability), specific Cronbach's α coefficients was tested. In this study, all distinguishing Cronbach's α coefficients fall in the range between 0.818 and 0.959, and these obtained values are all above 0.7 which is the recommended value. In terms of construct reliability of this study, the obtained values of composite reality fall in the range between 0.905 and 0.965, which are also greater than 0.7.

Factor loadings were performed for the indicator reliability analysis. Fairly comparable indicators are usually reflected in the construct and indicated by its high. Accordingly, values greater than 0.50 denotes significant factor loadings, and in this study, the factor loadings of the constructs are higher than of 0.7, with the exclusion of the item INFQ5 – INFQ5 was taken out because of low loading.

In determining the convergent validity, this study employed the average variance extracted. Convergent validity denotes the degree to which a given measure is positively linked to other measures of similar construct. The values of

average variance extracted in this study fall in the range between 0.713 and 0.846, which is greater than 0.50 which is the proposed tolerable value.

V. Discussion

The use of extended DMISM increases the comprehension concerning the role of compatibility and TL in online learning adoption and utilization amongst students of 9 public universities operating in Jordan. Also, it brings to attention the pertinent impacts and recommendations for administrators of university and policy makers, in order that the significances of online learning can be understood.

It was discovered in the present study that net quality significantly and positively affects the aspect of user satisfaction, implying that online learning of higher quality particularly in terms of flexibility, easiness, accuracy, newness, applicability, inclusiveness, interactivity, functionality and responsiveness will increase the students' belief that it meets their expectations, giving them satisfaction. The findings of this study are in agreement with those of past studies.

Also, total quality was found to significantly and positively affect actual use. This finding implies that online learning of higher quality particularly in terms of flexibility, easiness, accurateness, novelty, all-inclusiveness, relevance, interactivity, functionality and responsiveness will increase the usage duration and the usage frequency of students of online learning. This outcome is in agreement with that of past works.

The significant impact of TL on the satisfaction of user and actual use was affirmed by the findings of this study. Hence, it can be said that students are likely to feel satisfied and employ online learning when higher management stimulates their intelligence and motivates them through the appreciation towards their endeavour in online learning use. In regards to the role of TL,

this finding is in agreement with those of past studies.

VI. Conclusion

Online technology is consistently progressing and this has considerably affected the technology of education considering that it dictates future learning especially in terms of how it is to be carried out. Meanwhile, among the challenges faced by higher education sector in Jordanian include the expanding student population, low-quality education, inadequate resources and weak infrastructure. Accordingly, the present study looked into compatibility and TL as antecedents in DMISM among students enrolled in 9 Jordanian public universities. The outcomes obtained in this study implies the success of the proposed framework in proving the impact of the constructs of online learning on the academic performance of students. Additionally, compatibility and TL both are integral in the prediction of user satisfaction and actual use of online learning. It is therefore important for practitioners to pay attention to these factors that maximise performance standards.

The outcomes of the present study imply a considerable support towards the initiatives made by the government of Jordanian for the higher education sector for the purpose of generating a pleasant environment that would increase the inclination of students to utilize online learning, improve their academic professionalism and consequently, improve their working quality. The present study has therefore discussed its implications from the research and practitioners' standpoint. Limitations and several directions for future studies was also discussed.

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