

Professional Development Effectiveness of E-Learning on Quality of Students' Performance in Higher Education



Lamia Saad Alhazmi

Abstract: *Technology has played an important role in education, changing the learning environment's traditional style. Widespread use of technological devices harnesses the educational process and creates opportunities to make education available everywhere and at any time. E-learning provides a way to manage and overcome challenges faced by traditional higher education institutions by allowing them to be more competitive. This research conducted a case study of Taif University to evaluate the effectiveness of e-learning development in the higher education sector, and examined its impact on student performance quality, aiming to identify the important axes for developing higher education e-learning. The study analysed the requirements for developing e-learning and investigated opportunities to build and develop e-learning capabilities in higher education in general and Taif University in particular. Many external and internal influences contribute to e-learning trends in higher education; external funding, tuition fees, technology costs, and education development all influence internal pressure to reduce institutions' costs. Thus, higher education is turning to e-learning to relieve these pressures, because it significantly reduces costs and improves both learning effectiveness and learning outcomes compared to traditional methods. Despite the advantages of e-learning, some higher education institutions remain in the experimental stages of developing and benefiting from it. This research study the relationships between e-learning difficulties, providing requirements, supporting e-learning, and providing e-learning services in higher education and quality performance.*

Keywords: *E-Learning, Quality Performance, Higher Education, Quality*

I. INTRODUCTION

This study aimed to evaluate the effectiveness of e-learning development in the higher education sector and examined the impact of e-learning development on student performance. It identified important axes along which e-learning can be developed by analysing the requirements and opportunities for developing e-learning capabilities. It further aimed to identify the most important challenges to

e-learning development and propose appropriate solutions. Finally, the study aimed to develop participation methods and techniques for integrating e-learning into the learning environment.

II. LITERATURE REVIEW

E-learning is a way of coping with, and overcoming, certain challenges faced by traditional higher education institutions to ensure their competitiveness. Many external and internal factors have influenced the trend towards e-learning in higher education .

Constraints related to higher education institutions' external funding, tuition fees and technology costs, and education development pursuits, lead to internal pressures to reduce costs. This affects teaching methods; institutions are turning to e-learning to overcome these pressures [15] because e-learning has been shown to significantly reduce costs and improve learning effectiveness and outcomes compared with traditional methods [4].

Despite these advantages, some institutions are still in the experimental stages of developing e-learning courses, such as thoroughly developing advanced educational techniques and implementing available methods [14]. Nevertheless, many higher education institutions recognise the importance of adopting and developing e-learning policies to improve educational outcomes; therefore, a clear trend is emerging towards employing communication and education technology in institutions' transition to integrated education that expands education and development systems. Further, at the university level, institutions understand the importance of expanding their education systems' scope to benefit from the likely advantages of developing e-learning [5][6][7][8][9].

In a Saudi Arabian context, educational institutions should be directed towards virtual classrooms to overcome existing educational development challenges and facilitate economic growth to achieve the goals of the ongoing transformation program, Vision 2030 [6][7][8][9][10][11][12][13][14][15][16][17][18]. Therefore, the present study lays the foundation for successful e-learning transitions in higher education and identifies the important steps and axes along which e-learning can be developed in Saudi Arabia to benefit from a knowledge economy and the available e-learning technologies.

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Taif University was chosen for this case study because of its focus on the Vision 2030 goals for the educational sector and its related efforts to exploit opportunities and overcome challenges to increasing efficiency [3][4][5][6][7][8][9][10]. In the following sections, first, the research motivations are presented. A set of research objectives and questions is developed. Then, this study reviews the literature, including that on the main concept, and discusses e-learning in the higher education sector and the main challenges and opportunities in its development. It also considers the important axes along which e-learning can be developed and provides details about the Taif University's e-learning system. Further, the study's methodology and research design are described. The qualitative approach used for data analysis is explicated. Then, the analysis results are provided. Next, the research findings are discussed. Last, the study's conclusion is provided along with its recommendations, followed by a discussion on its limitations and future research directions. This study identifies the main axes that support e-learning development in higher education and the results can support universities in their move towards integrated education. The study also identifies the need and requirements for benefiting from integrated education. It is important to capitalise on currently available opportunities in universities to develop integrated education and identify critical challenges to and potential solutions for developing e-learning. It addresses the importance of e-learning and methods for developing integrated education and its application in higher education. The study also highlights the importance of developing e-learning to improve educational outcomes in Saudi Arabia and thus benefit of development the higher education sector.

III. HYPOTHESES DEVELOPMENT

Based on the previous discussion, the following hypotheses were developed regarding associations between quality performance (QP) and the study hypotheses:

- H1: There is a relationship between e-learning difficulties (ELD) in higher education and quality performance (QP).
- H2: There is a relationship between providing requirements and needs (PREL) in higher education and quality performance (QP).
- H3: There is a relationship between supporting e-learning (SEL) in higher education and improving quality performance (QP).
- H4: There is a relationship between providing e-learning services (PELS) in higher education and quality performance (QP).

IV. RESEARCH METHODOLOGY

The data for this study were collected from a questionnaire distributed to Taif University students through its learning management system, Blackboard. The 22 questionnaire items were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) and addressed five constructs: e-learning difficulties (ELD; five items); providing requirements and needs (PREL; five items); supporting

e-learning (SEL; five items); providing e-learning services (PELS; three items); and quality performance (QP; four items). The questionnaire took about 10 minutes to complete, and 532 responses were received.

A. Statistical Analysis

IBM SPSS Statistics, version 25.0 (IBM Corporation, Armonk, NY, USA) and AMOS [8] were used to analyse the developed model. Two-stage analytical procedures were conducted; the measurement model was examined first, followed by the structural model for hypotheses testing. Missing data were handled using the mean replacement technique [12][13][14][15][16][17][18][19].

B. Measurement Model

Table- I: Goodness of fit Criteria for the Measurement and Structural Models

Statistics	Suggested	Measurement model	Structural model
Goodness of fit index (GFI)	<0.90	0.910	0.912
Adjusted goodness of fit index (AGFI)	<0.80	0.852	0.858
Comparative fit index (CFI)	<0.90	0.912	0.921
Normal fit index (NFI)	<0.90	0.915	0.945
Root mean square residuals (RMSEA)	>0.08	0.052	0.062

The commonly used goodness of fit indices shown in Table 1 indicate a good model fit, with each fit index within the recommended parameters.

C. Measurement model validity and reliability

Because some measurement constructs were modified to fit the study context, Cronbach's alpha values were evaluated and found to be close to or above the threshold level of 0.7 [7][8][9][10][11][12][13]. thus, measurement construct reliability was deemed acceptable. The CFA results shown in Figure 1 reveal that all items were loaded on their assumed constructs, with factor loadings ranging from 0.74 to 0.134, and a mean greater than 0.70 for each construct. All constructs exceeded the recommended 0.7 threshold for composite reliability (CR) and 0.5 average variance extracted (AVE), as suggested by [2][3][4][5][6][7][8][9][10][11]. establishing convergent validity for the study measurements.

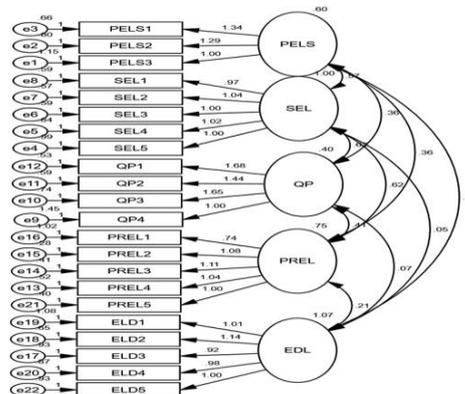


Figure I: Confirmatory factor model (CFA).



Factor scores were calculated from the fitted CFA model. All five important dimensions were significantly correlated with each other ($p < 0.05$). Table 2 lists the square root of average variances extracted (AVE) in the main diagonal, and discriminant validity statistics in the lower triangle. The square root of AVE was greater than the inter-construct correlation, and the mean square variance (MSV) was less than the AVE; therefore, the measures in this study demonstrated good discriminant validity.

Table II: Convergent and Discriminant Validities and Correlation Coefficients.

Construct	Alpha	CR	AVE	MSV	MaxR(H)	ELD	PELS	SEL	PREL	QP
ELD	0.853	0.859	0.551	0.054	0.866	0.742				
PELS	0.733	0.752	0.507	0.500	0.773	0.091	0.712			
SEL	0.873	0.877	0.589	0.518	0.881	0.052	0.705	0.768		
PREL	0.873	0.880	0.599	0.518	0.901	0.232	0.539	0.713	0.774	
QP	0.799	0.807	0.521	0.518	0.842	0.102	0.707	0.720	0.720	0.721

D. Structural Model and Testing Hypotheses

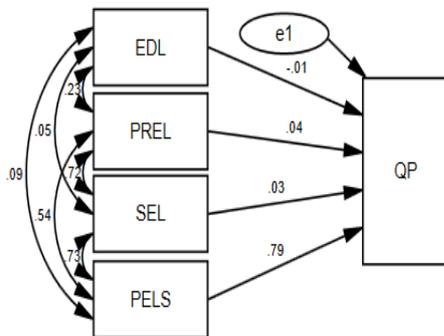


Figure II: The Structural Model of Quality Performance (QP).

Prior to evaluating path coefficient significance, multicollinearity was measured by examining the variance inflation factor (VIF) values, which were lower than the recommended value of 3.3 [1][2][3][4][5][6][7][8][9][10][11]. All goodness of fit criteria shown in Table 1 for the structural model presented in Figure 1 indicated that the model was a good fit to the data. As shown in Table 3, providing requirements and needs ($b=0.04, p<0.001$), supporting e-learning ($b=0.03, p=0.016$), and providing e-learning services ($b=.79, p<0.001$) were significantly related to quality performance (QP), confirming the significance of H2 through H4. However, e-learning difficulties ($b=-0.010, p>0.05$) did not significantly predict quality performance (QP); thus, hypothesis H1 was not supported. The estimated value of squared multiple correlations ($R^2=0.566$) revealed that the developed model predictors explained 56.6% of the variance in quality performance (QP).

Table-III: Estimated Path Coefficients.

Hypothesis	Indigenous Construct	Exogenous Construct	Estimate	Standardised	S.E.	P	Result
H1	QP	EDL	-0.111	-0.12	.008	.139	Not Supported
H2	QP	PREL	.048	.042	.013	<.001	Supported
H3	QP	SEL	.026	.026	.011	.0160	Supported
H4	QP	PELS	1.000	.791	.031	<.001	Supported

V. DISCUSSION

Education in Saudi Arabia is key to fulfilling its Vision 2030 plan because an educated workforce may significantly contribute to the country’s economy. In this context, e-learning is a valuable tool for facilitating education, regardless of learners’ geographical location. The results inferred a clear correlation between adopting e-learning and enhancing learners’ performance quality. Analysing the relationships between multiple factors (fulfilling higher education needs, supporting e-learning, and providing e-learning services) and quality performance showed that the best learning outcomes are achieved when these factors are managed. First, as shown in Table 3, the estimated path coefficient of meeting learners’ requirements was 0.48 ($b=0.04, p<0.001$), indicating a significant relationship between learners’ needs and their performance quality. In the current scenario, availability of traditional books is no longer sufficient for concept learning. With increasing technology use in education, learners’ needs are substantially changing. Only when these needs are met will performance quality likely reach the desired level. Second, supporting e-learning (the emerging concept in the pedagogy) also has a direct impact on learning objectives, as evident in the analysis results, with estimated path coefficient=0.026, $b=0.03$, and $p=0.016$. Educational institutions that have adopted and encouraged e-learning have demonstrated better learning outcomes, suggesting that the traditional learning modes currently prevalent in Saudi Arabia need to be replaced with more robust and modern pedagogy. Third, the analysis showed that e-learning has a tremendous impact on learners’ performance quality; the estimated path coefficient in this connection, which was 1, suggests a strong relationship between employing e-learning and improving student learning outcomes. The results, based on student feedback, clearly point to the urgent need for broad e-learning use in educating Saudi students. Therefore, radical reforms in the current education system are needed, and increased e-learning use will be a major step in that direction. In contrast to the three hypotheses just discussed, the hypothesis suggesting a relationship between e-learning difficulties and performance quality proved to be wrong, as indicated by the estimated path coefficient value of -0.011 ($b=-0.010, p>0.05$). This shows that the technical constraints associated with e-learning did not have the expected impact on performance quality. Increasing internet penetration and smartphone popularity among students at large allows them to be technically prepared to benefit from e-learning[17]. Despite the clear indication of e-learning positively influencing performance quality, the study has limitations and results need to be substantiated through further research. First, the data were collected from a single university and not every student participated in the study. Consequently, the study sample size is likely too small to be representative of the Kingdom’s entire student community.



Therefore, similar studies should be conducted in other major Saudi universities to increase the sample size, thereby increasing the reliability of the conclusions. Second, individual responses can reflect biased opinions pertaining to different constructs that could have had a significant impact on the inference drawn.

VI. CONCLUSION

Change is the only constant in nature, and education is not an exception to this rule. With increasing technology use, learning outcomes will follow a path that is likely to be radically different from the past. As Saudi Arabia embarks on the ambitious journey of Vision 2030, it needs to overhaul and fine tune its education system. It is supposed to integrate its educational system with technology-driven e-learning to enhance learners' knowledge levels and expertise. However, this is easier said than done because every stakeholder must break the status quo chain. The government should provide an additional push to include e-learning in the course curriculum; authorities need to train and prepare faculties for this change because they must implement it in a way that advantages their students. In tandem, learners must shed any hesitation surrounding adopting an e-learning mode as quickly as possible.

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