

Assessing the Efficacy of E-Learning Technologies in BS Graduates of Virtual University of Pakistan

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Abstract

The purpose of the study was to assess the efficacy of E-learning technologies in BS students at the Virtual University of Pakistan. This quantitative case study investigated the efficacy of e-learning technologies among 163 (sample) BS students at the Virtual University of Pakistan. Simple random sampling was used to select the participants. The self-developed questionnaire was the tool of the study; it comprised 27 items. The data were analyzed to employ SPSS. The study results showed that BS graduates agreed with various aspects of e-learning, such as task completion, mastering complex material, accepting challenges, and following instructions. The study will help optimize student's engagement and independence. This study recommended that in developing modules or activities to create independence among BS graduates, teachers should provide explicit instruction and communicate clearly for each e-learning activity or assignment. E-learning designers should design interactive, engaging, and relevant activities for students' interests.

Keywords: Assessment, Efficacy, E-learning, Technologies.

Introduction

The employment of e-learning technologies has significantly changed educational viewpoint internationally, providing learners with flexible, accessible, and interactive learning environments. In recent years, the Virtual University of Pakistan (VU) has increasingly embraced e-learning methodologies to cater to the diverse educational needs of its BS students. This study aimed to evaluate the efficacy of e-learning technologies among BS students at VU, focusing on various components, including mastery experience, verbal persuasion, information quality, system quality during e-learning, emotional and physiological factors (service quality), and individual satisfaction/user satisfaction (Hahmi et al., 2023). According to de Souza et al. (2021), e-learning is a natural evolution within distance learning that takes advantage of the most recent instruments to emerge in educational technology structuring. Andrews and Haythornthwaite (2007) divided e-learning into synchronous and asynchronous. Synchronous learning means a classroom course, lecture, or meeting using Internet technology.

On the other hand, Asynchronous learning is a computer-based training. According to Cantoni et al. (2004), e-learning is a natural evolution within distance learning that capitalizes on the most recent tools to emerge in educational technology. Asynchronous mode provides students access to audio/video lectures, handouts, and PowerPoint presentations. Students can be accessed anytime via a Learning Management System (LMS). A learning management system (LMS) is an assortment of technologies. This system stores course material and provides a structure for interaction among students and teachers, like a classroom (Watson et al., 2009).

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Finally, this quantitative case study aims to shed light on the multidimensional character of e-learning technologies and their impact on BS students' learning outcomes, satisfaction levels, and overall educational experiences at the Virtual University of Pakistan.

E-learning, as a pedagogical approach, has gained considerable attention in educational research, particularly in the context of higher education institutions like the Virtual University of Pakistan (VU). This literature review provides a comprehensive overview of key concepts, theoretical frameworks, and empirical studies relevant to understanding the efficacy of e-learning technologies among BS students at VU.

Several theoretical frameworks underpin research on e-learning efficacy, providing insights into the factors influencing students' learning experiences and outcomes. Bandura's Social Cognitive Theory (1977,1986) emphasizes the interaction of personal characteristics, contextual influences, and behavior in molding individuals' learning processes. Within this framework, concepts such as self-efficacy, mastery experience, and verbal persuasion are instrumental in understanding students' engagement with e-learning technologies.

Bandura's social cognitive theory aligns with the observed patterns among BS graduates in e-learning. This research emphasizes the importance of personal factors like mastery experience, verbal persuasion, and environmental influences.

The factors that influence e-learning efficacy:

As engineering becomes more prevalent in the younger grades, teachers can use a variety of tactics to assist children in developing engineering self-efficacy. According to Bandura (1997), the most influential source of self-efficacy is mastery experiences. Mastery experiences occur when students employ tools and approaches to address complex and challenging challenges (Bandura, 1997).

Social or verbal persuasion is the third source of self-efficacy development. This social persuasion may include verbal judgments made by others toward someone. Consequently, the third form of self-efficacy can be referred to as verbal persuasion. A person who receives verbal information regarding their potential to master a specific job or task is inclined to exert more significant effort and diligence in finishing a task (Pajares, 2002).

According to Kiri and Wagbara (2019), ICT provides a teaching tool with significant potential for improving the quality and principles of students' education. Concerning student achievement, the information and communication technology (ICT) program outperforms the traditional teaching style.

Parks (2022) reiterated that technology assists educators in preparing students for the real world and emphasizes that as our countries become more technologically dependent, it becomes increasingly necessary that learners acquire the skills to become well-informed about ICT to become good citizens.

D'Errico (2016) said that e-learners experience positive emotions during synchronous learning activities. They can chat with teachers and among students. They have their engagement dimensions of affective relevance and participation. Furthermore, emotions play an essential role during the interaction activities with the teacher. The previous research and the literature review revealed the following research gaps: population research gap, methodology research gap, and knowledge research gap; the present study has a different construct from the previous research.

Problem Statement

In the Virtual University of Pakistan (VU) context, the efficacy of e-learning technologies among Bachelor of Science (BS) students warrants thorough investigation. This study aims to provide valuable insights into the effectiveness of e-learning technologies. This study will also support enhancing the outcome-based study of BS students.

Study Objectives

To analyze the mastery experience, verbal persuasion, information quality, and system quality on the efficacy and engagement of e-learning technologies among BS graduates.

Methods and Materials

Research Design

The quantitative case study approach assessed e-learning technologies' efficacy among BS students at the Virtual University of Pakistan (VU).

Population

This study's population comprised all BS students enrolled at the Virtual University of Pakistan across all disciplines and academic programs.

Sample Size

The sample size of the study was 163 BS students.

Sampling Technique

This study used a simple random sampling technique. This ensured that every BS student in the population had an equal chance of getting selected.

Data Collection

The data were collected using a self-developed questionnaire. It was administered to the BS students at the Virtual University of Pakistan. The questionnaire was comprised of 27 items.

Instrumentation

The questionnaire was developed to follow the theoretical framework and existing literature. Mostly, items were deleted which were repeated and had the same sense through the expert's opinion.

Data Analysis

The data were analyzed through SPSS.

Table 1: Descriptive analysis

Sr. No	Statements	A+SA	Neutral	D+SD
1.	complete all the tasks (e.g. assignments, quizzes)	87.2	5.8	0.6
2.	master the difficult learning material.	80.3	11.6	2.3
3.	accept the challenge faced during the learning.	82.1	9.8	2.3
4.	easily adapt to the e-learning environment.	77.5	12.1	4.1
5.	follow the instructions for improved results.	88.4	3.5	1.8
6.	receive positive encouragement towards the semester activities	75.7	13.9	3.5
7.	e-learning system has clear instructions for completing the tasks.	79.2	10.4	3.5
8.	no need to seek any external help during e-learning.	58.4	14.5	19.7
9.	information and tasks are self-explanatory.	72.3	13.3	7
10.	information available on the University's website is useful.	81	8.7	2.9
11.	information available can be trusted.	80.9	8.7	2.9

12.	e-learning system easy-to-understand navigation system.	78.6	9.2	4.6
13.	differentiate between useful and irrelevant material for learning.	77.5	11	4.1
14.	learning websites find the information easily.	79.7	10.4	2.9
15.	e-learning site good website design.	77.5	11.6	2.3
16.	e-learning mechanism overcome the problems	75.1	13.3	4.1
17.	e-Learning system of University's website is self-sufficient.	73.4	12.1	7.5
18.	features of e-learning are updated.	68.8	17.3	5.2
19.	e-learning assess skills.	76.3	12.7	2.9
20.	e-learning increase the chances of achieving.	80.9	8.1	2.9
21.	use the e-learning voluntarily.	36.4	11.6	5.2
22.	satisfied with the e-learning process.	77.4	11.6	3.5
23.	online learning gives me more information.	71.7	11.6	8.7
24.	e-learning site helped to solve the problem.	70.5	16.2	5.2
25.	e-learning website increases my productivity.	74.6	13.3	4.1
26.	use online learning again	71.7	14.5	6.4
27.	e-learning website makes easier to do activities.	41.6	12.1	5.2

Table 1 shows that 87% of BS graduates agreed that they completed their activities during e-learning, 6% remained neutral, and 1% disagreed. Similarly, 80% agreed to master the problematic learning material, 12% remained neutral, and 2% disagreed. While 82% of them agreed to accept the challenge faced during the learning, 10% of them remained neutral, and 2% disagreed with it. 77% of BS graduates agreed to adopt the e-learning environment, 12% remained neutral, and 4% disagreed. 88% of BS graduates agreed to follow the instructions for improved results, 3% remained neutral, and 2% disagreed. 76% of BS graduates agreed to receive positive encouragement towards the semester activities from the faculty members of the University, 14% of them remained neutral and 3% disagreed. 79% of BS graduates agreed that the E-learning system has clear instructions for completing tasks, 10% remained neutral, and 3% disagreed. 58% of BS graduates agreed that there is no need to seek external help during e-learning, 14% remained neutral, and 20% disagreed. 72% of BS graduates agreed that all the information and tasks are self-explanatory. 13% of them remained neutral, and 7% disagreed on it. 81% of BS graduates agreed that the information on the University's website is functional, 9% remained neutral, and 3% disagreed. 81% of BS graduates agreed that the available information could be trusted, 9% remained neutral, and 3% disagreed. 79% of BS graduates agreed that the e-learning system is easy to understand. 9% of them remained neutral, and 5% disagreed with it. 77% of BS graduates agreed that they can differentiate between valuable and irrelevant material for learning. 11% of them remained neutral, and 4% disagreed with it. 80% of BS graduates agreed that the learning website allows them to find information quickly. 10% of them remained neutral, and 3% disagreed with it. 77% of BS graduates agreed that they think the e-learning site has a good website design, 12% remained neutral, and 2% disagreed. 75% of BS graduates agreed that e-learning overcame the problems, 13% remained neutral, and 4% disagreed. 73% of BS graduates agreed that the E-Learning system on the University's website is self-sufficient. 12% of them remained neutral, and 7% disagreed with it. 69% of BS graduates agreed that all the features of e-learning are updated. 17% of them remained neutral, and 5% disagreed with it.

76% of BS graduates agreed that they use e-learning to evaluate skills. 13% of them remained neutral, and 3% disagreed with it. 81% of BS graduates agreed that they use e-learning to

increase their chances of achieving better results. 8% of them remained neutral, and 3% disagreed with it. 36% of BS graduates agreed that they like e-learning voluntarily. 12% of them remained neutral, and 5% disagreed with it. 77% of BS graduates agreed they are satisfied with the e-learning process. 12% of them remained neutral, and 3% disagreed with it. 72% of BS graduates agreed that online learning gives them more information, 12% remained neutral, and 9% disagreed. 70% of BS graduates agreed that the e-learning site helped solve the problem, 12% remained neutral, and 9% disagreed. 75% of BS graduates agreed that the e-learning website increases productivity, 13% remained neutral, and 4% disagreed. 72% of BS graduates agreed that using online learning, 14% remained neutral, and 6% disagreed.

42% of BS graduates agreed that the e-learning website makes their activities more accessible. They will gladly do it; 12% remained neutral, and 5% disagreed.

Overall, BS graduates strongly agreed with various aspects of e-learning, like task completion, mastering complex material, accepting challenges, and following instructions. However, they had concerns regarding independence from external help and ease of activities.

Discussions

On the contrary, Algahtani et al. (2020) studied students' perceptions about E-learning as a teaching method. This cross-sectional survey was done from June 2017 to June 2018. Healthcare students were eligible for inclusion. Participants were given a 40-item closed-ended questionnaire separated into six categories: experience, diversity, consequences, efficiency, acceptability, and accessibility to E-learning. 60 % (n = 232) of students thought E-learning could broaden educational options. There is an increasing positive opinion of E-learning, but the level of acceptance is modest. The above-mentioned study's findings are consistent with the current study.

Another study has shown that online learning is becoming critical. E-learning tools are advancing student learning in classrooms. The study's results were that e-learning enhances participants' understanding (Zhang et al., 2012).

Previous research has shown that networked learning, which includes the use of social media and learning communities, can enhance the development of self-efficacy. However, there is a need for more research to explore the application of networked learning in academic contexts that integrate professional development. The current study presents an intervention that utilized networked learning to encourage student self-efficacy for social networking and professional development. A study on 72 undergraduate business students revealed significant improvements in self-efficacy for social networking and professional development activities because of the intervention. Additionally, students expressed a greater likelihood of engaging in these activities in the coming year (Anders, 2018). The study's results indicated patterns within the students' responses corresponding to general traits associated with successful learners, even though each student approaches online learning differently. It has been noted that students have opinions on the benefits and drawbacks of e-learning in higher education. The findings stressed the components of e-learning courses that potential online learners should consider while determining their preferences. Based on these findings, potential e-learners need to understand the differences between an e-learning classroom setting and a conventional classroom setting, as there are both advantages and disadvantages of e-learning in both environments, which can probably influence their overall performance as a student (Rashid et al., 2016). These findings have been verified by prior studies, where a wide range of learning styles is one of the advantages of e-learning for students (Rusu & Tudose, 2018; Raspopovic et al., 2016). Students prefer what they like, and e-learning helps them focus on subjects they appreciate. It was also discovered that students can choose the types of e-learning tools they want to employ. CD-ROM and the internet are employed as primary e-learning tools in other

circumstances. This happens because most students possess easy access to the Internet as they have a connection at home (Chang, 2016).

Similarly, it has been discovered that various multimedia inputs enable learners to seek knowledge relevant to their personal and prior experiences and participate in interdisciplinary training. Especially opposed to traditional classrooms, e-learning has the potential to act as a medium for an array of methods of instruction for different types of learners. Furthermore, e-learning is an influential tool because it may supply learners with distinct learning methods while improving their academic achievement. Students can actively participate in an e-learning environment to improve their thinking capacity and learn autonomously (Mumford & Miller, 2018).

Concluding Remarks

The current study suggested developing modules or activities that create independence among BS graduates. Kopzhassarova et al. (2016) conducted a study that said independent learning helps decision-making.

Another finding-based recommendation is that teachers should provide explicit instruction and communicate clearly for each e-learning activity or assignment. As Shuell (1988) said, instruction in learning can help the learner acquire new knowledge effectively.

E-learning designers should design interactive, engaging, relevant activities relevant to students' interests. Similarly, El-Sabagh (2021) conducted a study on the e-learning environment and its impact on the development of students' engagement. The study results were Interactive and engagement activities to enhance the student's knowledge and skills.

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