Factors Affecting E-Learning Performance in Private Higher Education Institutions: An Empirical Analysis

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Chronicle	Abstract

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This research investigates the determinants of e-learning performance in private educational institutions in the Sindh region. Employing a quantitative methodology, the study utilized a closed-ended questionnaire for data collection. The survey was conducted at five private universities in Sindh with a focus on their experiences with e-learning implementation in traditional classrooms. A total of 250 questionnaires were collected, out of which 233 underwent thorough examination. Structural equation modeling, specifically Partial Least Squares Structural Equation Modeling (PLS-SEM), was employed to analyze the proposed conceptual model, using variance as a basis for assessment. The study reveals that the Unified Theory of Acceptance and Use of Technology (UTAUT) constructs related to effort expectancy exert a significant and positive influence on student behavior. Conversely, the performance expectancy variable does not exhibit a statistically significant impact on student e-learning performance. Furthermore, student performance is directly affected by other factors, such as organizational structure and extrinsic motivation. In contrast, concerning student behavior, extrinsic motivation emerges as the sole influential factor. The study's findings suggest that elements shaping behavior, including organizational structure, extrinsic motivation, and effort expectancy, play pivotal roles in enhancing student e-learning performance.

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INTRODUCTION

The contemporary landscape of global development, marked by the advent of Industry 4.0 and disruptive innovation, underscores the prominence of digital economy, big data, robotics, and artificial intelligence. Amidst this transformative era, the emergence of the "digital generation," often denoted as "generation Z," stands out as a distinctive cohort. This generation exhibits a proclivity for multitasking, engages in prosuming, has been nurtured in a milieu of pervasive technological devices, and displays a preference for video content over textual information (Jones et al., 2010; Prensky, 2001; Toffler, 1981). In response to the unique characteristics of this digital generation, there arises an imperative for adjustments in higher education curricula. Professors are now tasked with not only imparting knowledge but also facilitating virtual communities, guiding students in acquiring new competences, and serving as moderators and mentors in the evolving educational landscape (Almenara, 2015; Giri et al., 2021; Buckingham, 2005).

Modern learning theories emphasize that learning is an active process involving knowledge creation, self-awareness, and meaning-making (Herrington, 2000). Consequently, educational strategies should involve challenging cognitive activities that foster teamwork, critical thinking, problem-solving, and self-control. Information and communication technology, as posited by Lim et al. (2011), serves as a valuable tool in encouraging students' creativity. It is incumbent upon educational institutions to equip students with the skills to conduct research, evaluate information sources, and continuously expand their knowledge. This approach, as opposed to mere transmission of facts, ensures that students are prepared to provide up-to-date solutions to the dynamic demands of the labor market (Tjahjadi et al., 2019; Shah, 2017; Julia & Onde, 2012).

The adaptability of education to diverse living situations becomes crucial in this context, with a focus on facilitating students' learning progress and enhancing the effectiveness of learning support and administration practices (Mujtahid et al., 2021). Various factors have been identified through studies as contributors to enhanced student performance, including class size (Kokkelenberg et al., 2008), multitasking (Lepp et al., 2014), and instructor quality (Azer, 2005). Furthermore, perceptions of instructors and fellow students, as observed by Ukut and Krairit (2019) and Islam and Azad (2015), along with motivation, environment, and student background, play pivotal roles in influencing student performance, as noted by Merino and López (2014) and Ukut and Krairit (2019).

This study builds upon the research initiatives of Ukut and Krairit (2019) and Merino and López (2014), exploring how organizational structural factors and instructors' extrinsic motivation impact students' behavior and performance. Acknowledging the limitations associated with the study's focus on private institutions in the Sindh region of Pakistan, primarily concerning information and communication technology systems, the research aims to address the overarching question pertaining to the use of e-learning technology in teaching and learning processes.

- To identify whether extrinsic motivation, organizational structure, performance expectancy, effort expectancy affects student behavior and performance?

- To examine whether there is positive relationship of student performance and behavior on user behavior.

LITERATURE REVIEW

To investigate the study's variables and framework, a review of the literature was performed. This review provides the context for this research and forms the basis for the creation of hypotheses. Below is a discussion of subtopics.

E-Learning Technology

This investigation is grounded in the conceptualization of e-learning technology articulated by Heemstra and Kusters (2004). They define e-learning as an amalgamation of dynamic technologies encompassing a range of technical tools and components designed to facilitate information and communication. These technological components comprise cellular networks, cable systems, satellite communication, telephony, computer-mediated communication, and video conferencing systems. Additionally, it encompasses various

digital technologies such as computers, the Internet, the World Wide Web, intranets, wireless networks, extranets, and software applications, as elucidated by Ukut and Krairit (2019).

UTAUT Model

The Unified Theory of Acceptance and Use of Technology (UTAUT), introduced by Venkatesh et al. in 2003, serves as a comprehensive framework for understanding user acceptability and behavior concerning technology. UTAUT identifies four principal components—performance expectation, effort expectancy, social influence, and facilitating conditions—that directly influence user behavior. Performance expectation reflects users' belief that employing a particular technology will enhance their productivity and work performance, representing the anticipated benefits of technology use. Effort expectancy, on the other hand, elucidates the ease with which users can interact with technology, emphasizing the simplicity and user-friendliness of the technology.

Social influence pertains to how users perceive the reactions of others and social groups regarding the use of technology. It explores the influence wielded by individuals who endorse and encourage technology use within their organizational context. Facilitating conditions encompass the accessibility of organizational and technical infrastructure necessary for technology utilization. Behavioral intention, a key component of UTAUT, gauges the likelihood of an individual adopting a technology, thereby exerting a discernible influence on practical behavioral implementation.

Within the realm of information and communication technology, user behavior is construed as the how and when individuals engage with technology, evident through usage patterns and motivations. The expansion of UTAUT incorporates considerations of organizational structure, motivation and environment, structural characteristics, and student performance, as substantiated by previous studies (Merino & López, 2014; Ukut & Krairit, 2019; Alsharari et al., 2015; Lwoga, 2014; Sipila, 2011; Moradi & Sabeti, 2014). These variables have been identified as factors influencing student performance, enriching the theoretical landscape of technology acceptance and usage. Although various characteristics were recognized as significant, the selection of these three constructs was informed by their statistical assessability in explaining technological adoption within the academic context.

Extrinsic Motivation

The researchers used the following measures of external motivation based on the literature: learning methodologies, parental participation, student motivation, and students' socioeconomic position. The following presumptions and interpretations guided the selection of these indicators, which were based on the body of available research. Parental involvement: Parents who are well-read and have an open mind will provide their children all the tools they need to study through information and communication technologies. Student performance will benefit from this (Lam & Ducreux, 2013). Student motivation: Research demonstrates that both internal and external student motivation can enhance academic achievement (Kaplan & Maehr, 1999). Learning methods: This demonstrates students' motivation and attitude towards learning as well as their capacity to define goals, map tactics to accomplish them, and learn (Kaplan & Maehr, 1999; Wong & Nunan, 2011). Socioeconomic status (SES) of the student: High self-esteem boosts

productivity. Pupils who can pay their tuition on time and have access to autonomous teaching and learning resources typically do better (Suleman et al., 2012; Ahmar & Anwar, 2013).

Organizational Structure

Youssef and Dahmani (2008) and Herli et al. (2020) elucidate the concept of organization within higher education institutions as the structuring of decision-making processes across units. This includes delineating how decisions are connected to the allocation of skills and strengths, as well as the nature of information and communication structures within these units. Consequently, a significant transformation has transpired in the allocation of power, expertise, and data within postsecondary educational institutions, with a shift from centralized control to the purview of the information and technology department (Youssef & Dahmani, 2008). Tasks are disseminated throughout the organizational structure before being explicitly categorized and coordinated. In alignment with the framework proposed by Robbins et al. (2008), a comprehensive consideration of organizational structure should account for the following five factors:1. Specialization or labor division to facilitate coordinated work.

- The authority flow, commands, and chain of command pertaining to the duties of the various levels within an organization.
- The scope of control, which establishes an organization's hierarchy and number of managers.
- Both centralized and decentralized, with management power serving as the basis for decision-making.
- Formalization, the standardization of work inside an organization in accordance with the regulations.

RESEARCH FRAMEWORK

Framework is based on the existing literature, which includes the findings of Erden (2013), Sung and Hwang (2013), and Goyal (2011).
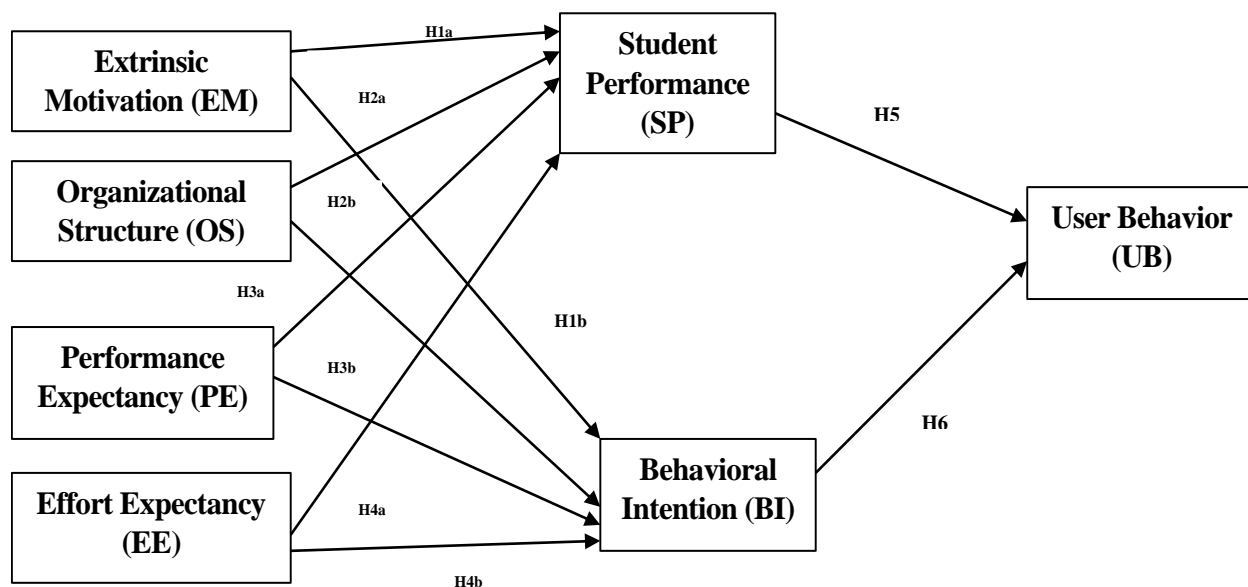

Figure 1.
Research Framework

RESEARCH HYPOTHESES

The study framework is created, and the following research hypotheses are formulated based on a survey of the literature and contributions:

H1a: Extrinsic Motivation is significantly related to Student Performance.

H1b: Extrinsic Motivation is significantly related to Behavioral Intention.

H2a: Organizational Structure is significantly related to Student Performance.

H2b: Organizational Structure is significantly related to Behavioral Intention.

H3a: Performance Expectancy is significantly related to Student Performance.

H3b: Performance Expectancy is significantly related to Behavioral Intention.

H4a: Effort expectancy is significantly related to Student Performance.

H4b: Performance Expectancy is significantly related to Behavioral Intention.

H5: Student performance is significantly related to the user behavior.

H6: Behavior intention is significantly related to the User Behavior.

RESEARCH METHODOLOGY

Study Design

Pakistan is a developing nation with several educational institutions utilizing e-learning technologies for instruction. Thus, it is possible to investigate its effect on student performance. By analyzing the effects of organizational structure, extrinsic motivation on student behavior and performance, as well as lecturer qualities, this study explores the elements influencing student success in the teaching-learning process. This study also investigates the effects of facility factors, social influences, performance expectancy, and effort expectancy on behavioural intention. Next, researcher also look at how user behavior affects student performance and how behavior intention affects user behavior.

Sample

The responders to the survey, which took place at a five Private sector Universities in Sindh i.e., (Iqra university, Agha Khan University, Shaheed Benazir Bhutto Institute of Science and Technology, Habib University, Ilma University, were accounting majors who had dealt with e-learning processes in the classroom. Between March 2023 and May 2023, 250 surveys were personally administered as part of the data gathering process. A total of 245 questionnaires were returned; of them, 233 could be examined in further detail. Researcher used Structural Equation Modelling (PLS-SEM) based on variance to test the suggested conceptual model.

Analysis and Findings

The questionnaire was divided in to two parts one is demographic profile of the respondents and other one is variables of the study. The main goal of this study is to verify each of the hypotheses. Every variable is subjected to direct testing of the hypothesis and the data.

Demographic Findings

Finding suggested that male respondents were more with 64.4%. Whereas from the Age group of respondents 21-30 age group were more with 35.2% and least were 41-60 with

15.87%. The results for the marital status showed that single status respondents were more with 59.65%. Respondents from the bachelors were more with 54.9 %, master's with 31.2% and others 6.8% as shown in table 1.

Table 1.
Demographic Profile

Variables	N (233)	%
Gender		
Male	150	64.4
Female	83	35.6
Age		
18-20	61	26.2
21-30	82	35.2
31-40	53	22.7
41-60	37	15.87
Marital Status		
Married	80	34.3
Single	139	59.65
Others	14	6.0
Education		
Doctorate	16	6.86
Masters	89	31.2
Bachelors	128	54.9

Path Analysis and Composite Reliability

The internal consistency of indicators and their construct is tested by composite reliability. The following is an illustration of the composite reliability test results: Table 2 shows that every variable has a composite reliability value better than 0.6. As a result, the study's model satisfies the composite reliability requirements.

Table 2.
Composite Reliability and R-Square

Variable	Composite Reliability	R-Square
Student performance (SP)	0.867	0.344
Extrinsic Motivation	0.870	
Organization Structure	0.860	
Behavior intention (BI)	0.849	0.429
Performance expectancy	0.773	
Effort Expectancy	0.843	
User behavior (OB)	0.825	0.467

Performance expectancy, effort expectancy, extrinsic motivation, and organizational structure all have an impact on the behavior intention construct (R^2 = 0.429). This suggests that these factors account for 42.9% of the variance in behavior intention, with additional variables outside the model accounting for the remaining 57.1%. Next, user behavior has an impact on the student performance construct (R^2 = 0.334), meaning that user behavior accounts for 33.4% of the variation in student performance. Moreover, behavior intention and

facility conditions have an impact on the user behavior construct (R2 = 0.467), which means that 46.7% of the variance in user behavior can be attributed to these factors.

Three categories were identified by Chin (1998) based on the R2 value: significant (0.67), moderate (0.33), and weak (0.19). As a result, it can be said that user behavior, student performance, and behavior intention all have modest R2 values. Subsequently, the inner weight output was used for hypothesis testing, and the outcomes are displayed in Table 2.

Table 3.
Test Results of Bootstrap Path Coefficient

No.	Construct	Original Sample	T Statistic	Result
H1a	Extrinsic Motivation ->Student Performance	0.222	1.965	Supported
H1b	Extrinsic Motivation ->Behavioral Intention	0.266	1.957	Supported
H2a	Organization Structure->Student Performance	0.220	1.898	Supported
H2b	Organization Structure->Behavioral Intention	0.190	1.625	Supported
H3a	Performance Expectancy->Student Performance	0.200	1.716	Supported
H3b	Performance Expectancy->Behavioral Intention	0.056	0.452	Not Supported
H4a	Effort Expectancy->Student Performance	0.272	2.675	Supported
H4b	Effort Expectancy->Behavioral Intention	0.357	3.563	Supported
H5	Student Performance->User Behavior	0.278	2.468	Supported
H6	Behavioral Intention->User Behavior	0.457	4.968	Supported

By using the UTAUT model, this study explores the variables influencing student success while utilizing a web 4.0 learning approach. Numerous research has been conducted; however, they have revealed some discrepancies in the factors that impact user behavior and performance. Moreover, scant research has been conducted to investigate how organizational structure affects student performance. The level of services offered to students will be influenced by the organizational structure. An organization with a dedicated information technology service unit will provide considerably better service than one with a service unit integrated with other departments.

Concentrate on what we know best, which is how student behavior during the use of technology in teaching and learning affects university students' performance. The next part discusses the research findings.

Extrinsic Motivation Influenced by Student Performance and Behavioral Intention

According to this study, student performance is influenced by a variety of external factors, such as parental participation, student motivation, learning methodologies, and socioeconomic level (SES). When web 4.0 technology is used in the teaching and learning process, students who are externally motivated will be better able to learn the material and have more access to it. Their GPA will be higher than normal, indicating that they have achieved well academically. They also perform well in extracurricular activities like athletics and the arts. Based on our research findings, H1a and H1b (β=0.222, T=1.965; β=0.266, T=1.957) approved as there is a substantial relationship between extrinsic motivation with student performance and behavioral intention. This is consistent with studies by Ahmar and

Anwar (2013), Merino and López (2014), and Ukut and Krairit (2019) that found a favorable relationship between external motivation and student performance.

Organizational Structure effects Student performance and Behavioral Intention

This study discovered that student performance is influenced by organizational structure and behavioral intention. The unit or section of the higher education organization in charge of information technology services is the organizational structure under investigation. It is true that enhanced services in the teaching and learning process for students using web 4.0 technology will be provided by the unit or section in charge of information technology management, which will raise student performance. According to our findings, organizational structure has a substantial favorable impact on student performance and behavioral behavior (β= 0.220, T=1.898, $p < 0.05$; β=0.190, T= 1.625, $p < 0.05$), supporting the acceptance of H2a and H2b. This result is consistent with the research conducted by Youssef and Dahmani (2008).

Performance Expectancy influence Student Performance and Behavioral Intention

This study reexamines the relationship between performance expectancy and Student Performance and behavior intention in accordance with the principles of UTAUT theory. H3a is supported since the result is significant (β= 0.200, T=1.716, $P<0.05$), whereas H3b is discarded (β= 0.056, T= 0.452, $P<0.05$) insignificant suggesting that performance expectation has no discernible impact. This might be because of the attitudes of the students in the study, which found no discernible behavioural differences between those who had high and low performance expectations. Due to the flexibility, they had in the learning process and the ease with which they could access a variety of material to assist both their academic and extracurricular interests, the students thoroughly appreciated the teaching and learning process utilizing web 4.0 technology.

Effort Expectancy Influence Student Performance and Behavioral Intention

Research also investigates the connection between student performance, behavioural intention, and effort expectation in this study. This study's findings demonstrate that student performance and behavioural intention is significantly influenced by effort anticipation (β= 0.272, T=2.675, $P<0.05$ β= 0.357, T= 3.563, $P<0.05$, supporting the acceptance of H4a and H4b. Students' behavior at private institutions in the province of Sindh has changed because of the use of web 4.0 technologies in the teaching and learning process. They anticipate that using technology will be simple. This result is consistent with studies by Venkatesh et al. (2003), Merino and López (2014), and Ukut and Krairit (2019) that found a positive relationship between effort expectation and behavior intention, as well as a substantial impact.

Student Performance and Behavioral Intention Influence User Behavior

According to this study, students' intentions improve performance, and both have a substantial impact on their user behavior (β= 0.278, T=2.468, $P<0.05$; β= 0.457, T= 4.968, $P<0.05$). H5 and H6 are therefore approved. This result is consistent with studies by Ukut and Krairit (2019), Merino and López (2014), and Venkatesh et al. (2003). Additionally, they noted that behavioural purpose significantly influences user behaviour in a good way. Furthermore, finding is also consistent with studies by Sipila (2011), Azer (2005), Moradi and Sabeti (2014),

Ukut and Krairit (2019), Lwoga (2014), and Sipila (2011) that found a favorable relationship between user behavior and student achievement.

CONCLUSION

Utilizing Web 4.0 technologies in university teaching and learning significantly enhances student performance. This research delves into the creation of the Unified Theory of Acceptance and Application of Technology (UTAUT) as a contributing framework. The investigation focuses on factors influencing student behavior and performance, encompassing extrinsic motivation, organizational structure, and expectations related to effort and performance. Analysis reveals that, with the exception of performance expectancy, UTAUT dimensions, particularly effort expectancy, significantly impact student behavior and performance. Additionally, student performance is directly influenced by supplementary variables such as organizational structure, external motivation, and structural facilities. It is essential to note that this study is confined to private universities in the province of Sindh. Consequently, caution must be exercised in generalizing the results to other nations. The study underscores the experts' consensus (95%) that user behavior is a key determinant of student success, thereby bridging the gap in understanding the relationship between user behavior and student performance within the UTAUT model. Furthermore, the intentions and actions of students in achieving academic and non-academic successes in universities in Sindh, Pakistan, exert a profound impact on the teaching and learning processes facilitated by information systems and Web 4.0 technologies in higher education.

DECLARATIONS

Availability of data and material: In the approach, the data sources for the variables are stated.
Authors' contributions: Each author participated equally to the creation of this work.
Conflicts of Interests: The authors declare no conflict of interest.
Consent to Participate: Yes
Consent for publication and Ethical approval: Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

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