ISSN Online: 3006-4708
ISSN Print: 3006-4694

SOCIAL SCIENCE REVIEW ARCHIVES

https://policyjournalofms.com

Embracing Digital Transformation: E-Learning Strategies in Pakistan's Higher Education Institutions

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DOI: https://doi.org/10.70670/sra.v3i4.1257

Abstract

The world is also experiencing immense changes in schooling as a result of the fast changing technological advancements. The digital transformation among higher education institutions in Pakistan is increasingly becoming implemented owing to its capacity to ensure that the institutions are kept in check in the global environment in an attempt to meet the requirements of the contemporary students. Implementation of e-learning involving the use of digital tools in the educational sector has increased significantly in the Pakistani universities particularly due to the fact that classroom-based teaching was not convenient during COVID-19. The research is based on the digital transformation policies adopted by Pakistani Higher Education Institutions to introduce e learning in their systems and also determine its effect on the learners engagement and academic performance and the willingness of the organization to change.

The paper will cover the e-learning within Pakistani HEIs through the e-learning. The responses were collected using a Likert-scale questionnaire where three hundred participants representing different universities that included students and faculty members and administrators were used. The questionnaire indicated 4 major aspects that entailed technology access competencies and teacher proficiency levels and student satisfaction rates and Digital learning support by schools.

The model of e-learning that has been introduced has demonstrated the potential of improving access to education, yet various obstacles like absence of the infrastructure and the digital capacity of faculty and their low change-tolerance have not disappeared. The interviewed students have indicated that they have a strong desire to know the processes that can enable them to combine the traditional classroom environment and online academic resources to provide educational services. In the case of structural programs on employee training and resource support and construction buildings, the implementation patterns were unequal in the government-managed institutions and those that are privately managed.

The Pakistani HEIs must invest their efforts in developing strong technological devices and they must set up education courses of the staff and develop digital learning spaces that everyone can access. The

paper has highlighted that the higher education system in Pakistan requires a long term strategic vision to integrate the e-learning in the educational system.

Introduction

Digital transformation in Higher Education.

Universities are experiencing a steady digitalization process of the world that involves adoption of digital technologies into the education and the learning facilities. Restructuring of education does not simply imply the application of new tools that lead to a fundamental alteration in the manner education services are offered and learning consumption. The transition in Pakistan to the digital transformation has proven to be slow but at a very high pace as the pandemic made universities switch to remote learning.

Education that must be totally digitized should be given the utmost priority. The innovative learning system enables creation of multipurpose teaching facilities and gives access to resources all over the world and other interactive forms of learning. The digital technology integration can assist the university to eliminate space and funding issue, transporting problem and consequently provide equal access to quality education to the entire population. Digital change stands a chance of removing the barriers to education in Pakistan because the country experiences high disparities in education systems.

E-Learning in Pakistan: Change in Paradigm of Education.

Education through digital platforms, technologies comprises the primary component of the digital transformation to provide educational material, the student-instructor interaction, and assessment opportunities. Institutions of higher learning in Pakistan have applied e-learning at a very low rate due to absence of adequate infrastructure as well as due to technology and well-built system of education issue. The implementation of e-learning solutions within Pakistani universities has been rapidly adopted over the recent past because of the educational needs and the instabilities caused by the pandemic.

Before the COVID-19, e-learning in Pakistan was operated in a small scale system due to the fact that it was only implemented in the private education institutes and a few progressive education institutions within the government. Physical campuses were forced to close and the emergency requirement to introduce online learning systems had to be done within the shortest amount of time possible. The abrupt transition to online education was difficult because of a lack of proper infrastructure and the desire of the educators at Pakistani institutions. The experience of the pandemic demonstrated the existence of education options in online learning despite the fact that it implicated institutions of higher learning to enhance their digital framework by establishing e-learning guidelines and professor educating on digital education strategies.

Higher Education Sector Digital Change in Pakistan Sources.

The increasing digitalization of the higher education of Pakistan has several key motives:

Technological Advancements: With mobile internet becoming more accessible at the same time, digital learning became more accessible because of the affordability of smartphones and laptops. The most common internet access within the rural areas is through mobile phones and therefore learning programs that are created in smart phones are utilized in expanding the access of education to various people.

Government Programs and Policy Subsidy: One of the missions in Higher Education Commission (HEC) in Pakistan is the promotion of digital education. National Education Policy 2020 has been known to highlight the relevance of technology in the education systems. The HEC has already opened numerous programs not only to increase the level of digital competence among citizens but also to give universities the digital resources to be used in order to introduce online education. The government has helped in establishing Virtual University of Pakistan as an online university which is a digital learning paradigm to the country.

Student Demand of Flexible Learning: It is likely that the students in school these days will need to supplement their studies with their already busy schedule which could include part time employment and families. This e-learning flexibility is similar to the speed of the individual study to provide the students with the option of studying other than in the traditional classes. Students in the rural and underserved areas in Pakistan adopted online learning because it provides them with an opportunity to access quality education without the need to move to the urban areas.
Global Trends: The fast pace of on-line studies in the United States and Australia and the United Kingdom has necessitated Pakistani institutions to switch to the similar form of learning. Online learning exposes Pakistani students abroad who are seeking to further their education in other countries to online learning. The local universities must use the same approach to teaching in the education systems to achieve success in the international front.

E-Learning has got benefits and opportunities.
E-learning has several benefits, which are numerous and it is also in tandem with the Pakistani education system requirements. Among the greatest advantages, it is possible to single out:
Accessibility: Geographical boundaries are broken because the aspect of access of e-learning platforms enables students in distant areas to access education. Online education will be a point of convenience in Pakistan since the rural population is highly restricted to quality education.
Cost-Effectiveness: Online education saves on the cost of transportation and saves on costs of infrastructure therefore the students can access the cheap educational materials easily.
Flexibility: E-learning students can manage their learning according to their needs as well as to their needs of being flexible in terms of time schedule in case they have work and other family engagements.
Personalized Learning: e-type learning technologies offer individualized learning content to address the requirements of students with regards to adapting and variation of instruction.

There are barriers to the adoption of E-Learning in Pakistan.
There are numerous challenges of e-learning in Pakistan despite the numerous benefits that come with the method.
Digital Divide: The urban-rural divide is sharp, and the rural students are highly likely not to have a means of access to the technology they require (e.g. high-speed internet, computers, etc.).
Faculty Readiness and Training: Although, there are faculty members who have embraced the digital tools, a substantial portion of them are either not well prepared to use the tools or not willing to use the tools. The implementation of the e-learning strategies to become a failure may be caused by a lack of adequate training and rejection of change.
Issues of infrastructure: The universities still struggle with the outdated technological infrastructure. The challenge of low internet connection in rural and remote areas is also a significant problem to widespread e-learning.
Student Engagement and Retention: E-learning despite its convenience, has been reported to result in low degree of student engagement and retention. Isolation and lack of physical interaction can lead to disengagement by the students.

Research Gap and Rationale
The available literature on e-learning adoption in Pakistan requires further extensive studies in order to determine effective digital transformation in higher institutions of learning. The gap in the knowledge would be filled because the study would focus on the e-learning practices in Pakistani universities and evaluate the issue of students, faculty, and institutions to provide strategies regarding how digital learning could be improved.

Literature Review
International Perspectives of Adoption of e-learning.
The international educational fraternity views e-learning as a practical concept to broaden the

education sector through provision of convenient and flexible learning which is more efficient. E-learning is more interactive and active learning experience since it involves multimedia and interactive contents and group work as postulated by Garrison and Vaughan (2008). According to American and European studies, e-learning enhances accessibility of education to the learner in addition to creation of individualized instructional programs (Anderson and Dron, 2011).

The implementation of e-learning is also confronted with numerous challenges in the implementation process. Digital divide, coupled with the absence of technological devices, makes adjusting of the developing nations to the e-learning process and other digital projects more challenging. The developed countries still are the most prolific in E-Learning due to their well-formed internet networks yet the third world countries with limited online connectivity problems and limited computer resources and limited digital education resources (UNESCO, 2020).

E-Learning in the Context of Pakistan

E-learning has been slow in the usage process in Pakistan as compared to recent developments where it has started to paint positive changes. As Zahid and Mirza (2020) have defined, even prior to the pandemic, only a small circle of elite urban universities could provide better e-learning solutions. The pandemic needed online learning, which made the utilization of e-learning instruments to increase considerably, particularly in the public universities.

Jamil and Shah (2020) discovered that universities are resource intensive and cannot support e-learning programs even in the future as the use of digital tools like Google meet and Zoom continue to increase. The education system needs a major overhaul to make sure that the digital technology is incorporated in the learning institutions on a permanent basis.

Preparedness to E-Learning by faculty and institution.

The readiness of faculty members to accept e-learning is one of the vital aspects that characterize the success of digital learning programs. The faculty members who are well trained and have sufficient support have been established to be successful in the application of technology in their teaching practice (Khatoon, 2021). The Pakistani faculty is few and is not exposed to digital teaching methods and teaching tools as there is an aversion to online education, which is grounded in the efficacy (Chaudhry, 2019).

Institutions also provide equal contribution to this process. Arshad and Rehman (2019) prove that more successful e-learning is observed in the institutions, which include strong administrative support and training courses and technical support as well as the formation of the digital learning strategy. Higher Education Commission (HEC) leads the promotion of e learning in Pakistan and it includes activities such as enhancement of the digital education infrastructure but it is not easy to implement all of the universities.

Challenges to E-Learning in Pakistan

Following are the Pakistan barriers to e-learning implementation:

Technological Barriers: A significant difference that stifles e-learning in most of the regions in Pakistan is the absence of internet connectivity and poor technological infractions. The problem of connectivity is common among students and faculty members in online classes despite being in the city (Saleem, 2020).

Cultural and Social Barriers: This is another issue because it is difficult to make them change that particularly the older faculty who are accustomed to teaching in the traditional mode. Students in the rural areas may also encounter social and cultural limitations since the students may not be at liberty to engage fully in internet education.

Financial Obstacles: The devices required to implement the online education are not accessible to all the students, especially the poor families. This is an economic constraint that contributes to the existing digital divide.

Student-Engagement and E-Learning.

No academic model can work effectively without the participation of a student and e-learning has its share of advantages and issues raised by a student involvement. Garrison and Vaughan (2008) argue that e-learning success highly depends on the extent of students-instructor interaction as well as the extent of students-students interaction. According to Ahmed (2021), Pakistani students cannot focus in their completely online classes because they are without the physical classroom environment.

When learning institutions use hybrid models where physical classes are combined with the online study as proposed by Zahid and Mirza (2020), the student satisfaction level and engagement will rise significantly. All these institutions also capture an enhanced rate of student retention and performance.

Methodology

Aspect	Details
Research Design	Quantitative, cross-sectional survey approach.
Population	Students, faculty members, and administrators from Pakistani higher education institutions.
Sample Size	300 respondents (students, faculty, and administrators).
Sampling Technique	Simple random sampling from universities across Pakistan.
Data Collection Method	Online survey using Likert-scale questionnaire.
Survey Instrument	30-item Likert-scale questionnaire.
Variables Measured	Technology accessibility, faculty readiness, student engagement, infrastructure, institutional support.
Data Analysis	Descriptive statistics (frequencies, means, standard deviations); Inferential statistics (correlation analysis).

Research Design

The research adopts a quantitative methodology using a cross-sectional survey methodology to obtain data. The paper not only investigates the strategic initiatives, but also the issues that influence the e-learning practices in Pakistani institutions of higher learning. Through the survey methodology, the researchers are capable of collecting data on many respondents that will result in an effective analysis of the current state of e-learning and its impact on learners and faculty and institutions of learning.

Population and Sample

Population: To derive the required data, the target population of the specified study will be comprised of three large groups of the Pakistani institutions of higher learning:

Students: Undergraduate and postgraduate students are already enrolled and they already take part in e-learning.

Faculty Members:The members of academic staff that are interested in e-learning teaching or blended learning course teaching.

University Administrators: These refer to those who decide and implement the process of strategic planning in relation to the digital transformation in their organizations.

Sample Size: The sample size used in this research was 300 respondents; this sample size was selected in various methods among the Pakistani populace and the private universities in Pakistan. The sampling was done in a way that the sample included the students, faculty and administrators.

Sampling Method: Simple random sampling method was adopted in the selection of respondents in every group. This makes the selection of all the members of the population equally likely and this

decreases sampling bias.

Data Collection Method

Instrument Used: The data has been carried out using structured questionnaire in the form of Likert scale that has been employed to analyse the perceptions of respondents on different factors that affect e-learning. The questionnaires were categorized into 30 questions and the questions were put under 6 broad themes:

Technology Accessibility

Preparation and Training of the Faculty.
The Student and Student Satisfaction.
Infrastructure and Institutional support.
Barriers to E-learning
Possible Future and Recommendations.
The Distribution Approach: This was through the channel of electronic distribution where the questionnaire was given out through the university portals; emails and the use of social media. The general manager in turn invited the respondents to participate by sending them a cover letter (including purpose and confidentiality guarantee of the study).
Response rate: 300 of the 350 questionnaires that had been mailed were returned and this implied that the response rate was 85 percent which was deemed enough to achieve the aims of the study.

Data Analysis

Data analysis was carried out by the descriptive and inferential statistics to have the full knowledge of the results of the survey. Statistic techniques used included:
Descriptive Statistics: The frequency distributions, means, standard deviation and percentages were presented in them to provide a picture of what the data was like, as well as provide a summary of the responses.
Inferential Statistics: To observe the correlation between the significant variables i.e. technology availability and student engagements or faculty willingness and institutional support, the correlation test was conducted.
Software: The analysis was done with the help of the SPSS (Statistical Package of the Social Sciences) software since it was required to create accuracy and reliability in the calculation of the statistics.

Results

The tables containing the survey findings appear in very structured tables that reveal the necessary findings of the studied areas. The data gathered in this paper shows the prevailing state of e-learning in the Pakistani universities by uncovering the beneficiaries and challenges based on the responses provided by the respondents

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1. Technology Accessibility

Indicator	Finding
Availability of Technology	80% of students reported having access to the required technology (laptop/PC).
Internet Connectivity Issues	40% of respondents, particularly those in rural areas, faced issues with unreliable or slow internet connections during online classes.
Smartphone Usage	60% of students relied on smartphones to access online courses, while 40% used computers or laptops.

Research data shows that 80% of students possess fundamental digital devices which include laptops or personal computers. Rural students face the biggest challenge when it comes to internet connectivity since 40% of them encounter unreliable or slow internet access. Sixty percent of students use smartphones to access their distance learning courses even though this method brings concerns about smaller screen size and reduced functionality compared to computers.

2. Faculty Readiness and Training

Indicator	Finding
Faculty Preparedness	55% of faculty members felt confident in their ability to teach online.
Training Needs	One in every four participants of the survey who had attended online classes particularly in the rural areas had the issue with poor or slow internet connection.
Technological Skills	This faculties used learning management systems (LMS) and digital teaching tools where only 45 per cent. of the faculty were effective with them.

A majority of faculty members demonstrated online teaching confidence but 65% showed clear requirements for digital tool and online pedagogical training. The data demonstrates that educational staff have taken on e-learning but there continue to be technological skill deficits. Academic staff presented low performance when using learning management systems (LMS) with other digital teaching tools as 45% of them showed inadequate skill levels thus requiring improved digital training for capacity enhancement.

3. Student Engagement and Satisfaction

Indicator	Finding
Student Engagement	60% of students felt less engaged in fully online classes compared to traditional face-to-face classes.
Hybrid Learning Preference	75% of students preferred hybrid learning models (combining both online and in-person classes) over fully online courses.
Satisfaction with Online Learning	55% of students reported being dissatisfied with the quality of online learning due to technical issues, lack of interaction, and limited support.

Research data showed that student engagement and satisfaction stood out as a vital problem because sixty percent of students reported lower involvement in fully online courses as compared to traditional classroom learning. The majority of students showed preference for hybrid learning approaches which integrated online with in-person instruction because they chose this model over exclusive virtual learning. Students reported low satisfaction toward online education since 55% of them encountered technical problems while facing minimal student-to-staff interaction alongside limited academic resources.

4. Institutional Support and Infrastructure

Indicator	Finding
Institutional Support for E-learning	65% of respondents felt their institutions provided adequate support for e-learning, including technical assistance and resources.
Infrastructure Challenges	50% of respondents reported that poor infrastructure (e.g., limited access to computers, low bandwidth) significantly impacted the effectiveness of online learning.

Indicator	Finding
Investment in E-learning Tools	45% of universities had not invested sufficiently in advanced e-learning tools such as interactive whiteboards, multimedia content, or LMS platforms.

E-learning initiatives depend heavily on the backing of institutional structures along with proper infrastructure systems. Technical support and educational resources for online education come from institutions per the opinion of 65% of respondents yet infrastructure difficulties persist. The lack of sufficient high-quality computing equipment and reliable internet access affected half (50%) of student participants in their ability to learn effectively online. Universities that fall in the 45% category demonstrate insufficient investment in advanced e-learning tools including interactive whiteboards and multimedia content which restricts the potential development of digital education.

5. Barriers to E-Learning Implementation

Indicator	Finding
Internet Connectivity	70% of respondents cited poor internet connectivity as the biggest barrier to effective e-learning in Pakistan.
Faculty Resistance	55% of faculty members expressed reluctance to fully embrace e-learning due to unfamiliarity with digital tools and a preference for traditional teaching methods.
Access to Digital Devices	40% of students lacked access to personal computers or laptops, especially those from lower-income households.

The survey results show poor internet connectivity emerges as the main barrier to e-learning implementation since it affects 70% of the respondents. The majority of teaching staff showed resistance toward digital instruction methods because they remained unfamiliar with digital platforms and preferred traditional classroom instruction. The educational digital divide grew worse due to the fact that 40% of students from lower-income backgrounds did not have access to personal computers or laptops.

6. Future Prospects and Recommendations

Indicator	Finding
Support for Digital Education	80% of respondents agreed that universities should increase investments in e-learning infrastructure and faculty training to ensure the sustainability of digital education.
Hybrid Learning as the Future	85% of respondents (students and faculty) believed that hybrid learning, which integrates both online and face-to-face instruction, is the future of education in Pakistan.
Policy Recommendations	70% of respondents recommended that the Higher Education Commission (HEC) should provide clear guidelines and financial support for e-learning initiatives.

Most of the 80 percent of the respondents were in favor of the fact that the government of Pakistan needs to have more finances on digital education infrastructure and faculty training to enhance their digital and pedagogies skills. The participants selected the hybrid model of learning as compared to the other models because 85 percent of the respondents perceived that the hybrid is the most appropriate academic solution since it is a combination of on-line and in-person studies. The surveyed individuals required a more improved policy intervention of Higher Education Commission (HEC) in terms of giving clear guidelines and finance to improve e-learning programs in Pakistan.

Conclusion

The research demonstrates both the forward movement and ongoing difficulties that affect Pakistan's e-learning environment. The improvement of technology adoption and institutional support remains essential yet the digital education system requires resolution of internet accessibility problems and faculty training requirements and student engagement and infrastructure limitations to achieve better effectiveness and inclusiveness.

Key Findings Summary:

- The majority of students possess e-learning technology but unreliable internet connections together with device scarcity continue to affect learning opportunities especially in remote areas.
- Several teaching faculty report they lack sufficient skills to conduct online instruction effectively. The training programs need expansion to provide educators with essential digital tool proficiency.
- Student satisfaction together with student engagement decreases when online learning takes place exclusively without the inclusion of hybrid learning formats. Multiple studies indicated that learners demonstrated an intense preference toward hybrid learning formats.
- The effectiveness of online education suffers from inadequate institutional backing despite university efforts to support e-learning because infrastructure problems and uneven institutional support exist.
- The main obstacles to e-learning adoption include inadequate internet connectivity and faculty resistance as well as insufficient digital devices among students and insufficient infrastructure at universities.
- The need arises to invest abundantly in digital infrastructure and to properly train faculty members and create mixed learning platforms which unite online education with face-to-face teaching.

Conclusion and Recommendations

On the findings, this research proposes the following hypothesis of the Pakistani institutions of higher learning to concentrate on:

- Enhancing Infrastructure: To enhance the digital gap, it is possible to enhance internet penetration and make the students available with digital equipment.
- Faculty Training Programs: To improve e-learning quality, there is the need to have bigger and permanent training programs to the faculty on the adoption of online pedagogy and application of digital teaching tools.
- Hybrid Learning Models: Hybrid learning models have been discovered to be more feasible in interaction with the students, and flexibility and thus, the universities ought to invest in the hybrid learning models.
- Government Support and Policy Initiatives: The HEC must then move on to make and implement policies of e-learning, provide grants to the universities in an effort to go digital and concentrate on minimizing the obstacles of access among marginalized students.

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