# Embracing Digital Transformation in Higher Education Institutions (HEIS) in Balochistan During The Covid-19 Era

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**Abstract**

This study investigates the impact of digital transformation on Higher Education Institutions (HEIs) in Balochistan during the COVID-19 era, focusing on challenges faced by students and faculty members. The background underscores the unprecedented disruption caused by the COVID-19 pandemic, prompting the Higher Education Commission in Pakistan to transition HEIs to e-learning. The objectives of the study were; (1) To discuss the role of digital transformation for Higher Education Institutions (HEIs) in Balochistan during the COVID-19 pandemic era, and (2) To find out the challenges associated with the paradigm shift for the students and faculty members in Higher Education Institutions (HEIs) in Balochistan. The design of the study was explanatory sequential mix method with 314 male and 213 female students and 35 faculty members as respondents. Quantitative data collected through questionnaires were analyzed by descriptive statistics (Percentage, Frequency, Mean Score), and qualitative data collected through focus group discussion were analyzed with the help of thematic analysis. The study findings revealed widespread agreement on digital transformation enhancing flexibility, preference-based learning, and providing educational opportunities, but mixed opinions on extending education beyond classrooms and faculty skills. The study contributes valuable insights into the experiences of students and faculty, highlighting both positive and negative effects. The conclusion emphasizes the significant improvements brought about by digital transformation, such as enhanced education quality and expanded resource access. However, challenges like digital literacy and infrastructure limitations persist, necessitating strategic interventions for the full realization of e-learning's potential in Baluchistan's higher education landscape.

**Keywords:** Technological Awareness, E-learning, Digital Leadership Skills, Higher Education, COVID-19 Pandemic, Digital Transformation, Paradigm Shift.

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## 1. INTRODUCTION
### 1.1 Background of the Study
Throughout history, the world has repeatedly encountered minor and major crises, ranging from natural catastrophes and wars to social unrest and financial turmoil. These crises have left profound scars on the lives of the affected populations, who often invest their entire livelihoods and resources in recovery efforts, only to find their outcomes less than satisfactory. The COVID-19 pandemic, a global disruption of unparalleled magnitude, has affected countries across the economic spectrum, exposing both overt and covert vulnerabilities in existing financial models designed to manage higher education systems during dire situations (Ali, 2020).

In response to the COVID-19 pandemic, the government of Pakistan took decisive action by closing all educational institutions nationwide on March 13, 2020. Following these directives, the Higher Education Commission (HEC) in Pakistan instructed higher education institutions to transition to distance e-learning modes, reschedule ongoing examinations, and provide continuous online support to students throughout the duration of the crisis (Ali, 2020). This unprecedented challenge prompted educationists in Pakistan to contemplate the introduction and implementation of e-learning in Higher Education Institutions (HEIs), catalyzing a paradigm shift in higher education.

### *1.1.1 State of Higher Education in Balochistan before the COVID-19 Pandemic*
Before the onset of the COVID-19 pandemic, the state of higher education in Balochistan, Pakistan, presented a unique set of challenges and opportunities. Balochistan, being the largest province in Pakistan with a predominantly rural population, faced distinct hurdles in providing quality higher education to its residents. Limited access to educational resources, infrastructure, and qualified faculty members were among the persistent issues that hindered the development of higher education institutions (HEIs) in the region (Ahmed, 2018).

The Higher Education Commission (HEC) of Pakistan has acknowledged the disparities in educational development across provinces, with Balochistan often lagging in key indicators. The province faced difficulties in attracting and retaining qualified teaching staff, leading to a lower student-teacher ratio compared to other regions in the country (HEC, 2019). Additionally, the lack of modern educational infrastructure and technological resources posed challenges for the integration of innovative teaching methods and contemporary learning practices in higher education institutions within Balochistan.

Economic constraints and limited financial resources further exacerbated the educational disparities, impacting the overall quality of higher education in Balochistan. Despite these challenges, there were initiatives and aspirations to enhance the higher education landscape in the province, with the hope of fostering intellectual growth and socio-economic development (Balochistan Higher Education Endowment Fund, 2020).

Understanding the baseline conditions of higher education in Balochistan before the COVID-19 pandemic is crucial for evaluating the subsequent impact of the global crisis on the region's educational landscape. The unique challenges faced by Balochistan's higher education institutions set the stage for an examination of the adaptive measures taken during the pandemic and the potential long-term implications for the province's educational system.

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## 1.2 The COVID-19 Pandemic and Higher Education in Pakistan

The COVID-19 pandemic unleashed global chaos and confusion, sparing no aspect of society, including higher education. Countries and universities worldwide mobilized their utmost efforts to mitigate the pandemic's adverse effects, striving to protect their populations and ensure the sustainability and continuity of higher education. These efforts extended from individuals to organizations and entire nations, exemplifying the extraordinary challenges posed by the pandemic (Aboagye et al., 2020).

### *1.2.1 Challenges faced by higher education in Pakistan during the pandemic*

The challenges faced by e-learning in Pakistan, particularly in the context of Higher Education Institutions (HEIs) and with a focus on Balochistan, have been acknowledged in existing literature. Some key points from the literature are:

**1)      Inadequacy of Facilities in Educational Institutions:**
Lack of proper infrastructure, including reliable internet connectivity and access to necessary technology, hinders the effective implementation of e-learning (Mumtaz, M & Sumra, K, et al., 2022).
**2)      Capacity Enhancement for Institutions and Professionals:**
There is a recognized need to enhance the digital literacy and technical skills of both educational institutions and professionals to adapt to e-learning methodologies (Mumtaz, M & Sumra, K, et al., 2022).
**3)      State-of-the-Art Teaching Resources and Materials:**
The literature emphasizes the requirement for high-quality teaching resources and materials to support students in their e-learning journey (Mumtaz, M & Sumra, K, et al., 2022).
**4)      Utilization of Visual Aids and User-Friendly Resources:**
The literature underscores the importance of incorporating visual aids and user-friendly resources to facilitate effective knowledge delivery in the e-learning environment (Mumtaz, M & Sumra, K, et al., 2022).
**5)      Implementation of Conference Calls and Recordings:**
The adoption of tools like PowerPoint, conference calls, and recordings is seen as essential for interactive and engaging e-learning experiences in the Pakistani context (Mumtaz, M & Sumra, K, et al., 2022).

## 1.3 Statement of the Research Problem

In Pakistan, the progress of e-learning has encountered several challenges that need to be addressed. These challenges include the inadequacy of facilities in educational institutions, the need to enhance the capacity of institutions and professionals to effectively deliver education, the requirement for state-of-the-art teaching resources and materials to support students, and the necessity for the utilization of visual aids and user-friendly resources for knowledge delivery, as well as the implementation of conference calls and recordings using tools like PowerPoint (Mumtaz, M & Sumra, K, et al., 2022). Therefore, this research aims to explore the opportunities created by the shift towards digital transformation and enlist the challenges as well associated with it during the COVID-19 era for Higher Education Institutions (HEIs), with a specific focus on Balochistan. First and foremost, the study will

help to deal with the challenges of digital literacy and infrastructure. Establishing digital literacy programs for students and faculty, along with infrastructure improvements such as reliable internet connectivity and access to necessary devices, can address these challenges. In addition, the study will pave the ways for preparation and institutional capacity building. Implementing strategic plans for digital transformation, providing professional development opportunities for staff, and fostering a culture of innovation can enhance the readiness of institutions for digital changes. On the other hand, the study will sort out or alleviate the issue of the availability of internet and digital devices in HEIs) in Pakistan. Surely, collaborating with government and private sectors to improve infrastructure, providing subsidies for digital devices, and creating community internet access centers can address the issue of accessibility. It goes without saying that the study findings do contribute to the successful implementation of digital education in Balochistan's higher education landscape.

## 1.4 Importance of Research

The findings of the study on the digital transformation in higher education institutions (HEIs) in Balochistan provide valuable insights that can lead to improvements in educational practices. It will improve the quality of higher education in Balochistan. That include the Implementation of targeted training programs for educators to enhance their digital teaching skills, incorporating interactive multimedia content, and adopting modern assessment methods can improve the overall quality of education. Furthermore, the study will extend the access to the resources. Investing in digital libraries, online research databases, and collaborative platforms can further enhance access to educational resources, ensuring students and faculty have a wide range of materials at their disposal. Similarly, the study will provide flexible mode of learning. Developing a hybrid learning model that combines online and traditional classroom methods, providing recorded lectures, and offering flexible scheduling options can cater to diverse learning preferences and schedules. Additionally, the study will contribute to develop a hybrid learning model that combines online and traditional classroom methods, providing recorded lectures, and offering flexible scheduling options can cater to diverse learning preferences and schedules.

## 1.5 Objective of the Study

The objective of the study was the following:
1.      To discuss the role of digital transformation for Higher Education Institutions (HEIs) in Balochistan during the COVID-19 pandemic era.
2.      To find out the challenges associated with the paradigm shift for the students and faculty members in Higher Education Institutions (HEIs) in Balochistan.

## 1.6 Research Question

The research question was:
1.      What was the role played by digital transformation for Higher Education Institutions (HEIs) in Balochistan during the COVID-19 pandemic era?
2.      What were the challenges associated with this digital transformation for students and faculty members in Higher Education Institutions (HEIs) in Balochistan?
This study aims to investigate the role of technological transformation in Higher Education

Institutions (HEIs) in Balochistan during the COVID-19 pandemic era. The findings of this study hold the potential to shed light on the strengths and weaknesses of e-learning in dire situations such as the COVID-19 pandemic, particularly within the context of higher education in Balochistan.

## 2. REVIEW OF LITERATURE

The literature review represents a crucial phase in the research process, playing a significant role in facilitating the researcher's access to information from prior studies. It serves as a vital means to optimize the utilization of time, human resources, and financial investments. In this study, the researcher has diligently reviewed a wide range of literature, striving to achieve a comprehensive understanding of the chosen topic. It is important to emphasize that only a pertinent, reliable, and methodical review of literature can substantially contribute to the successful completion of one's research objectives. The present research endeavors to explore the paradigm shift toward digitalization in Higher Education Institutions (HEIs) within the context of Balochistan amidst the COVID-19 pandemic.

In the wake of the COVID-19 pandemic, higher education institutions (HEIs) in Balochistan faced unprecedented challenges, prompting the need for a rapid and comprehensive digital transformation. Contextualizing this transformation is crucial to understanding the unique circumstances and constraints faced by Baluchistan (Mumtaz, M & Sumra, K, et al., 2022). The region, characterized by its vast and sparsely populated areas, presented logistical challenges in ensuring access to quality education. To enhance local relevance, it is essential to highlight the specific contextual factors, such as limited internet connectivity, infrastructure constraints, and socio-economic disparities, which influenced the digital transition in Baluchistan's HEIs (Mumtaz, M & Sumra, K, et al., 2022).

Despite the challenges, Baluchistan's HEIs demonstrated resilience and adaptability, implementing various successful strategies in response to the digital transformation imperative. A balanced perspective in the literature review is essential, not only addressing the hurdles faced but also showcasing instances of innovation and effective solutions. For instance, highlighting initiatives such as collaborative efforts with government agencies, leveraging existing community resources, and creative use of technology to bridge connectivity gaps can provide a holistic understanding of the digital transformation landscape in Baluchistan's higher education sector (Mumtaz, M & Sumra, K, et al., 2022).

To strengthen the study's connection to the local higher education landscape, incorporating specific data and examples from Baluchistan is paramount. Utilizing data on student demographics, access to digital devices, and the impact of the digital divide on learning outcomes will provide a clearer picture of the challenges faced (Qazi, M. A., Sharif, M. M. A., & Akhlaq, A., 2022). Additionally, citing examples of successful digital education programs, online teaching methodologies, and collaborations with local industries will offer insights into the practical strategies implemented by HEIs in Baluchistan. By grounding the literature review in the specific context of Baluchistan and incorporating data-driven examples, this study contributes to a nuanced understanding of the digital transformation journey in the region's higher education institutions.

**2.1 Digitalization transformation in Higher Education Institutions in Balochistan during COVID-19 pandemic era.**

It is indisputable that the education system constantly contends with the need to adapt to evolving societal demands. The outbreak of the COVID-19 pandemic serves as a stark reminder of the imperative for adaptable practices in education, enabling effective teaching and learning at all levels of global schooling. Across the world, traditional modes of education underwent a profound transformation in the first quarter of the 2020 academic year, as educators and students turned to online alternatives as a primary consequence of the pandemic's impact (Mbhiza, 2022). This shift has placed significant pressure on educational institutions worldwide to respond proactively to the evolving landscape and meet the urgent needs of society.

The outbreak of the COVID-19 pandemic highlighted the necessity for responsive practices that can facilitate effective teaching and learning at all educational levels worldwide. It prompted a dramatic shift in the conventional methods of instruction in early 2020, with online options becoming the predominant mode of delivery due to pandemic conditions. As a result, educators swiftly recognized the imperative for a paradigm shift, necessitating the introduction and implementation of digitalized education. This paradigm shift has provided fertile ground for the adoption of digital education in higher education institutions in Balochistan. Pakistan, in response to this evolving landscape, initiated various measures to support and respond to the educational paradigm shift (Leung et al., 2020).

**1: Enhancing the Quality of Higher Education Institutions**

Extensive research endeavors have been conducted in developed countries to assess the impact of the paradigm shift towards e-learning on the quality of higher education institutions. Numerous factors come into play when evaluating the quality of this paradigm shift, including the interplay between attributes of e-learning service quality, overall e-learning service quality, and student satisfaction with e-learning. Researchers are diligently examining how the quality of education has influenced the teaching and learning processes within higher education institutions, as well as its effects on student loyalty. Pham et al. (2019) have established that the quality of e-learning significantly contributes to the overall educational experience, encompassing the domains of learning, teaching, and research.

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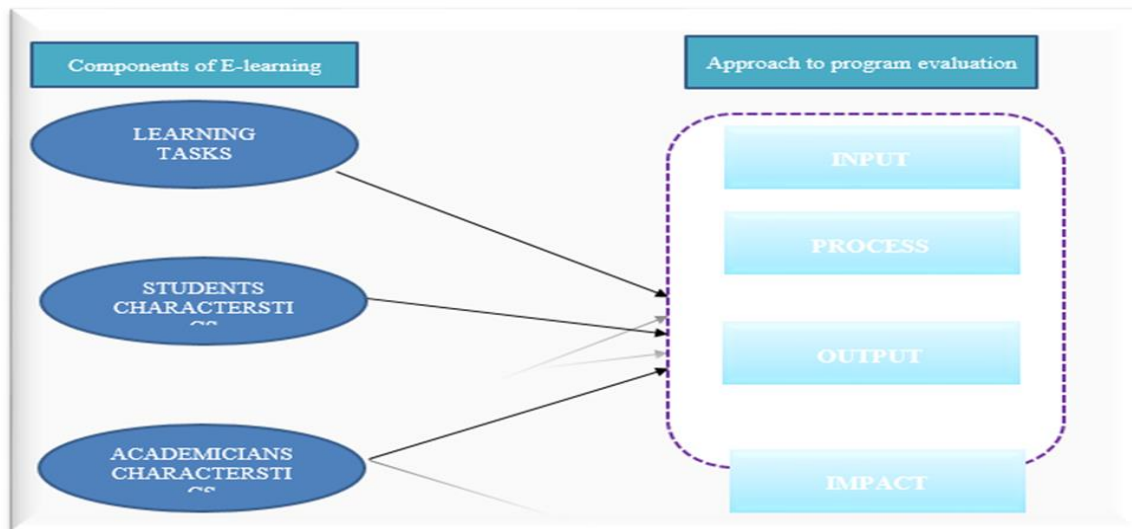
### 1: 1 Quality in Higher Education



*Figure: 1Quality in higher education*

### 2: Expanding the Horizons of Education through E-Learning

Our global future is evolving in response to communication, collaboration, and innovation, all of which are intrinsically linked to technology. The internet has transformed into a global marketplace, a universal workspace, and a worldwide gathering platform, providing an extensive range of opportunities not only for learning about the world but also for engaging with it. E-learning unquestionably empowers universities to integrate with the global educational landscape and explore educational prospects (Qazi, M. A., Sharif, M. M. A., & Akhlaq, A., 2022).

### 3: Fostering Dynamic Learning Opportunities

E-learning stands as a paramount force in the global educational landscape, offering flexibility in teaching, learning, and the research process (Alqahtani & Rajkhan, 2020). To preserve these dynamic features, e-learning necessitates the availability of suitable hardware, software, technological tools or platforms, and an internet connection. While some educational institutions provide laptops and tablets to students for a certain period, many students may rely on their parents to furnish them with the necessary resources to continue their e-learning journey.

### 4: Enhancing Students' Academic Performance

In response to the adverse impact of the pandemic and the necessity of lockdown measures, higher education institutions worldwide transitioned from face-to-face instruction to e-learning (Hamdan & Aomori, 2020). However, online teaching and learning present a significant challenge for both university educators and students. It necessitates the adoption of new teaching and learning strategies to achieve effective academic outcomes, creating a virtual learning environment that grants students online access to lectures and information while requiring instructors to adopt innovative approaches to curriculum delivery, personalized skill assessment, and the overall learning experience.

### 5: Valuable Lessons for Higher Education Institutions (HEIs)

According to Alqahtani & Rajkhan (2020), the COVID-19 pandemic has disrupted every facet of life, leaving a profound impact on all aspects of human existence. It has imparted an unforgettable lesson to humanity, prompting the world to concede swiftly, despite claims of progress and advancement in various fields. In a positive context, it has engendered a global awareness among nations, compelling them to formulate more robust strategies for coping with such catastrophes. The pandemic and the shift from face-to-face learning to e-learning have imparted the following essential lessons.



*Figure 2: Lessons Learned by the COVID-19 Pandemic in Various Aspects of Higher Education*

### 2. 2 Challenges Associated with this Digital Transformation

Advances in information technology are seen as a powerful driving force in today's higher education environments. The technological development of online learning means communication tools, resources, and electronic tools that facilitate online learning or distance learning. Regarding online education, the transition to online learning in higher education brings new demands for digital innovation (Singh and Thurman, 2019). Smart devices and smart technologies can be great tools for online learning. These technical devices are very important to improve the overall effectiveness of online education in colleges. However developing countries like Pakistan have very few opportunities to implement information and communication technology (ICT) as a means of education in and after COVID-19 (Najib and Ranjan, 2020; Harris 2020; Anderson, 2020; T, Urner Lee, 2020). Various studies have examined critical issues affecting online education such as communication devices and online platforms in crisis.

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### 1: Technology Bottlenecks

In online and remote education, technology bottlenecks are frequently seen as the primary obstacle to overcome. Numerous exact examinations embraced the mechanical difficulties in on the web or distance schooling in agricultural countries. To work with quality instruction, training services ought to finance the schools to get another PC and train new instructors who can show online schooling.

### 2: Institutional Preparedness.

The COVID-19 pandemic has suddenly prompted institutions and universities in Pakistan to start distance/online learning without proper experience and preparation. This exposed vulnerabilities not only at the school level but also in higher education worldwide. This pandemic has shown that flexible online education systems are needed to face such a crisis (World Bank, 2020a; Huang et al., 2020). Some institutions, especially in remote areas with traditional education systems, face enormous challenges in developing countries. Institutions and universities using web-based information management systems also face enormous problems. In countries like Pakistan and its impoverished states like Balochistan, the lack of preparation and institutional capacity for online education is evident in online and other problems of many organizations. Named challenges and stumbling blocks associated with this paradigm shift.

### 3: Academic Integrity.

The adaptation to online education due to COVID-19 raises questions about academic integrity (Hundred, 2020; Huang et al., 2020; UNESCO, 2020). The traditional face-to-face training system is designed for reliable evaluation and planning. The shift to online learning has brought a variety of assessment tools to teachers and students (Singh and Thurman, 2019). These tools are childish for most institutes and universities. In long-term courses, evaluation through online systems is not very productive (Huahong et al., 2020; INEE. 2020b; Ferdinand, 2020). Teachers who lack online teaching skills and experience face challenges with online assessments such as quizzes. Students are also confused and frustrated because they have never taken an online class. As educators around the world transition to distance learning, they face many concerns about academic integrity.

In Pakistan, the new experience of online education creates confusion about academic integrity. This requires a lot of proper planning and design review. Due to the lack of sufficient bandwidth and internet access, there are insufficient resources to understand the various assessment requirements of the course. Another challenge is privacy and security issues in online education during COVID-19. Misuse of technology is common worldwide and privacy issues are more critical in Pakistan. Considering the above discussion, the following hypotheses are derived.

### 4: Digital Divide.

During COVID-19, the term digital divide explained gaps in the availability and use of internet devices (Trucano, 2020; Jalli, 2020). The pandemic has led to uncertain access to information and communication technology (David et al., 2020; Fifield 2020; Kohli and Blume 2020; Huang et al., 2020). This has greatly worsened the digital divide globally and in most

developing countries (USAID, 2020; Burns, 2020a; Trucano, 2020; and Education Endowment Foundation, 2020). In distance and online learning, the digital divide has caused major disruptions in higher education in Pakistan. According to key statistics, only 35% of Pakistan's population has access to the Internet (Global Digital Report, 2019). While smartphone penetration in Pakistan is huge, ICT usage is much lower. Internet penetration across the country is 35%, 78 million broadband connections and 76 million mobile internet with 3G/4G extension (Inclusive Internet Index, 2020).

3. METHODOLOGY

3.1 Study Design

Explanatory sequential mixed method was used as the design of the study, (It is also called a two-phase model; Creswell & Plano Clark, 2011). This design consists of two steps. First, collecting quantitative data, and then collecting qualitative data to help explain or elaborate on the quantitative results.

An explanatory sequential mixed method design involves the collection and analysis of quantitative data followed by the collection and analysis of qualitative data to provide a comprehensive understanding of the research question. This design is suitable for this study due to its ability to combine the strengths of both quantitative and qualitative methods, facilitating a more holistic exploration of the digital transformation in Balochistan's HEIs during the COVID-19 pandemic (Creswell, J. W., & Creswell, J. D. 2017). The Explanatory sequential mixed design used in this study is illustrated in the following figure:



3.2 Population and Sample Size

The Population of the study consisted of 3414 students (both males and females), and 114 faculty members in universities of Balochistan. All the public and public universities and their sub-campuses were included.

Stratified random sampling was used for the students of Higher Education Institutions (HEIs) in Balochistan. According to L.R.Gay (10th addition), stratified sampling is a way to guarantee the desired representation of relevant subgroups within the sample. Stratified sampling involves dividing the population into subgroups (strata) based on certain characteristics and then randomly selecting samples from each stratum. In the context of discussing the role of digital transformation for Higher Education Institutions (HEIs) in Balochistan during the COVID-19 pandemic era, stratified sampling can be employed to ensure the representation from both male and female students. The criteria for this sampling approach are as follows:

**1. Identification of Strata:**

The primary strata are male and female students.

• Subdivide the total student population (517) into two strata: Male students (314) and Female students (213).

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**2. Proportional Allocation:**
Ensure that the sample proportionally represents the gender distribution in the total population.
• For instance, if the total sample size is 100 students, allocate approximately 60.7% (314/517) for male students and 39.3% (213/517) for female students.

**3. Random Sampling within Strata:**
Randomly select students from each stratum. This can be achieved using random sampling methods, such as random number generators or a random selection mechanism, ensuring every student has an equal chance of being selected.

**4. Adequate Sample Size:**
Ensure that the sample size from each stratum is sufficient to provide meaningful insights into the experiences and perspectives of both male and female students regarding digital transformation in HEIs.

Similarly, for the faculty members, purposive sampling was used. According to Creswell (2014), "Purposive sampling involves selecting participants because you believe that they might contribute something to your analysis". Purposive sampling, also known as judgmental or selective sampling, is a non-random sampling technique where the researcher deliberately selects participants based on specific criteria relevant to the research question. In the context of discussing the role of digital transformation for Higher Education Institutions (HEIs) in Balochistan during the COVID-19 pandemic era, employing purposive sampling for faculty members can offer several advantages:

**1. Expertise and Experience:**
• Faculty members are selected based on their expertise and experience in the field of digital transformation in education. They may have valuable insights, having directly experienced the shift to online teaching during the pandemic.

**2. Diverse Perspectives:**
• Purposefully selecting faculty members from various disciplines, academic ranks, and levels of experience can provide a diverse range of perspectives on how digital transformation has impacted teaching and learning across different domains.

**3. Information Richness:**
• Given the limited sample size (30 faculty members), purposive sampling allows for in-depth exploration of the experiences, challenges, and innovations related to digital transformation. This approach is particularly beneficial when seeking detailed and context-specific information.

**4. Specific Criteria:**
• Criteria for selection can include factors such as years of teaching experience, familiarity with digital tools, and active engagement in the digital transformation process. This ensures that the selected faculty members are well-positioned to provide meaningful insights.

**5. Efficiency and Focus:**
• Purposive sampling is often more time and resource-efficient compared to random sampling methods. By focusing on faculty members with specific characteristics, the research can target those who are most likely to contribute relevant and valuable information.

**6. Depth of Understanding:**
- The goal of discussing the role of digital transformation in HEIs during the pandemic is to gain a deep understanding of the faculty's experiences. Purposive sampling allows for the selection of participants who can provide rich, detailed narratives and reflections

Through stratified random sampling techniques, 314(61%) male and 213(41%) female students were selected. While, through purposive non-random sampling technique 30(26%) faculty members were selected.

**3.3 The Research Instruments**
The researcher has carried out a thorough literature review to develop the research instruments. The items of the questionnaire and focus group discussion were adopted from the relevant literature Alyahya, M, A. et al., (2022); Sobaih, (2020); Mrs.Sandra Mascarenhas (2021); Antonopoulou (2021); and Sidra Noreen, Muhammad Abid (2020). At first phase, the researcher has adopted five-point Likert scale questionnaire with alternatives such as strongly agrees (SA), agree (A), Undecided (UN), strongly disagree (SA); and for qualitative data focus group discussion was adopted.

**3.4 Data Collection and Analysis**
For data collection, the researcher has obtained a permission letter from the Chairman, Department of Education, and Faculty of Social Sciences Greenwich University Karachi. The researcher also got permission letters from the universities of Balochistan, addressing students and faculty members. The researcher has made a personal visit to the population and collected data from respondents.

After the collection of data, at the first stage, quantitative data collected through closed five-point Likert scale questionnaires were entered into software known as Statistical Package for Social Sciences (SPSS) and analyzed with the help of descriptive statistics. Likewise, qualitative data collected through focus group discussions were analyzed with the help of thematic analysis. Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within the following procedure was used for thematic analysis:
1. **Familiarize yourself with your data.**
2. **Assign preliminary codes to describe the content.**
3. **Search for patterns or themes in your codes across the different interviews.**
4. **Review themes.**
5. **Define and name themes.**
6. **Produce your report.**

**3.5 Ethical Considerations**
1. The study didn't pose any threat to the participants
2. Hazard to the physical and mental health of respondents.
3. Respondents were asked to sign a consent form.
4. The confidentiality of survey participants was secured by moving consent forms from the survey questionnaires.
5. Information that was given by respondents, has been kept confidential and will be used only for this research

**3.5 Data Analysis and Interpretation**
Both descriptive and thematic analysis was used for data analysis. For quantitative data, descriptive analysis was performed using IBM SPSS Statistics. Where mean score, percentage,

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and standard deviation were used to examine differences between groups. Furthermore, through thematic analysis, qualitative data was interpreted as it focused on the outcome obtained via discussions among focused groups.

**Phase 1: Quantitative Data Analysis**

This section deals with the quantitative data analysis using descriptive statistics, in which standard deviation, mean and percentage were drawn to understand the perspective of students at higher levels about post-COVID-19 opportunities and the role of digital leadership in higher education institutions in Balochistan. In this section, through descriptive statistics, the opinion of the respondents was drawn through the help of the table.

**Participants' Characteristics**

*Table 1*

*Gender of the Students of Higher Education Institutions*

| Gender | Male | Female | Total |
|---|---|---|---|
| | 314 | 213 | 517 |

As far as the demographic information of the students in Higher Education Institutions (HEIs) in Balochistan is concerned, the number of participants for the study was 517. Among these participants, 314(61%) were male and 213(41%) were female.

*The Role of Digital Transformation for Higher Education Institutions in Balochistan during COVID-19 Era.*

*Table 2*

*The Role of Digital Transformation for Higher Education Institutions in Balochistan during COVID-19 Era.*

| S. N | Statement | SD | D | Un | A | SA | S. D | Mean |
|---|---|---|---|---|---|---|---|---|
| 1) | Likely in the world, e-learning has improved the quality of higher education while introducing modern trends in teaching, learning, and research in Balochistan. | 106(21%) | 53(10%) | 95(18%) | 180(35%) | 83(16%) | 3.156 | 1.375 |
| 2) | E-learning extended higher education beyond classrooms, university territory, and international boundaries as well. | 137(26%) | 62(12%) | 56(11%) | 155(30%) | 107(21%) | 3.328 | 1.389 |
| 3) | Through E-learning, students of Balochistan attend their classes and perform educational activities at the workplace, at home, or anywhere through computers and | 122(24%) | 147(28%) | 68(13%) | 111(22%) | 69(13%) | 3.377 | 1.314 |

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| S. N | Statement | SD | D | Un | A | SA | S.D | Mean |
|---|---|---|---|---|---|---|---|---|
| | mobile devices connected via the internet and the university's e-learning system. | | | | | | | |
| 4) | E-learning accessed digitalized tools and educational-related information to university students. | 73(14%) | 49(09%) | 82(16%) | 210(41%) | 103(20%) | 3.357 | 1.331 |
| 5) | Due to e-learning, students learn according to their preferences, such as e-library, videos, audio, and e-books, available in every institution and territory. | 88(17%) | 53(10%) | 70(14%) | 210(40%) | 96(19%) | 3.381 | 1.338 |

The data presented in the above table offers valuable academic insights into the paradigm shift toward digitalization in higher education institutions in Balochistan. Where a greater number of respondents have agreed that e-learning has brought significant improvements to the quality of education, expanded access to resources, and facilitated flexible learning, challenges such as digital literacy and infrastructure limitations persist. Addressing these challenges and investing in the necessary support systems are crucial steps in realizing the full potential of e-learning in Balochistan's higher education landscape.

**Challenges Associated with the Digital Transformation in Higher Education Institutions (HEIs) in Balochistan**

*Table 3*

***Challenges Associated with the Digital Transformation in Higher Education Institutions (HEIs) in Balochistan***

| S. N | Statement | SD | D | Un | A | SA | S.D | Mean |
|---|---|---|---|---|---|---|---|---|
| 1 | There are more challenges than opportunities associated with digital transformation for Higher Education Institutions (HEIs) in Balochistan. | 47(09%) | 44(09%) | 66(13%) | 210(40%) | 150(29%) | 3.479 | 1.315 |
| 2 | Higher Education Institutions (HEIs) in Balochistan have faced enormous challenges as far as the lack of preparation and | 71(14%) | 43(08%) | 83(16%) | 210(41%) | 110(21%) | 3.470 | 1.296 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | institutional capacity are concerned amid and after COVID-19. | | | | | | | |
| 3 | Faculty members in Higher Education Institutions in Balochistan are having experiences and skills to be engaged with online learning and assessment amid and after COVID-19. | 69(13%) | 37(07%) | 81(16%) | 187(36%) | 143(28%) | 3.456 | 1.859 |
| 4 | There is a low percentage of students who have the availability of internet and digital devices in Higher Education Institutions (HEIs) in Balochistan Amid and after COVID-19. | 73(14%) | 58(11%) | 69(13%) | 217(43%) | 100(19%) | 3.412 | 1.305 |

The data presented in the above table has offered a greater harmony among the opinions regarding challenges associated with the digital transformation in Higher Education Institutions (HEIs) in Balochistan. Where, the indicator is that there are more challenges than opportunities to embrace the digital transformation.  Additionally, the lack of preparation and institutional capacity emerged as the second indicator as far as the majority of responses are concerned. Following the lack of skills and experiences of the faculty members and the availability of internet and digital devices.

**Phase 2: Qualitative Data Analysis**

The data obtained from the participants were analyzed with the help of thematic analysis. The researcher established two themes and sub-themes that determined the research question answered by the participants. According to Attride-Stirling, identified themes help to explain important points about a study's research questions, and aid in representing the answers or meanings given to each research question, (2001).

The data obtained from the faculty members in higher education institutions in Balochistan were analyzed separately and then analysis was conducted. Additionally, direct quotations from research findings and data sources are presented clearly in the tabular findings. During the content analysis conducted by the researcher, the participants coded abbreviations such as "EMR", "EFR", and "EdMR" etc. followed by a number (i.e., EMR1, EFR1… EdMR 1), etc.

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**The Role of Digital Transformation for Higher Education Institutions in Balochistan during COVID-19 Era.**
*Table 4*
***The Role of Digital Transformation for Higher Education Institutions in Balochistan during COVID-19 Era.***

| Theme | Subthemes | Sample Codes | Supporting Quotations |
|---|---|---|---|
| The Role of Digital Transformation for Higher Education Institutions in Balochistan during COVID-19 Era. | **In Case of Improving Quality of HEIs** | E-learning service quality and student satisfaction | "--- due to certain defects, the quality of e-learning has compromised and it led to the student's dissatisfaction" (EnFR3). |
| | **Made the field of Education beyond the Boundaries** | Our global future and e-learning | "---E-learning has provided higher level educators, a global marketplace, a global workspace, and a global meeting place that provides a vast array of opportunities to not only learn about the world but interact with the world" (CFR2). |
| | **Dynamic Way of Attaining Educational Opportunities** | E-learning and flexibility<br><br>E-learning and learning internationally | "__E-learning has provided the biggest benefits to the education landscape globally while providing flexibility in its way of teaching, learning and research process." [MR6]<br>"Due to e-learning, education is not limited by any time and space, as can take place at the workplace, at home or anywhere through computers and mobile devices connected via internet and university's e-learning system." (EdFR2).<br>"---Contrary to traditional learning methods, e-learning allows students, employees in training, and casual learners to participate in an organized learning experience regardless of their physical location" (EnMR5).<br>"--- in my point of view, web-based instruction is the perfect solution to meet the needs of life- |

| | | long learners because it is available on demand, does not require travel, and is cost-efficient" (CFR3). |
|---|---|---|
| **Improve Students' Academic Opportunities** | Various learning strategies and e-learning | "---because of COVID-19, Online teaching promotes learning by encouraging the students' use of various learning strategies at hand and increasing their level of commitment to educational tasks" (LFR3). |
| **A Learned Lessons for Higher Education Institutions (HEIs)** | E-learning and Balochistan | "--- I felt that, along with the world, Pakistan and its provinces such as Balochistan, learned an unforgettable lesson that they forced to surrender in no time, despite all claims of advancement and improvement in different disciplines" (MSFR2). |

The findings obtained by examining the participant faculty members' opinions on the role of digitalization transformation in Higher Education Institutions in Balochistan HEIs during COVID-19 pandemic era are presented above in Table 3.

When Table 3 is examined, where the responses of the participant faculty members on the role of paradigm shift toward digitalization in Higher Education Institutions in Balochistan HEIs are grouped under five sub-themes: enhancing the quality of HEIs, broadening educational horizons, adopting dynamic approaches to educational opportunities, improving students' academic prospects, and deriving valuable lessons for HEIs. The responses received from faculty members underscored the significant impact of the COVID-19 pandemic in creating educational opportunities for both students and academics. E-learning was acknowledged as a global platform that transcends physical boundaries, providing flexible learning alternatives and facilitating access to international educational opportunities. However, some concerns were expressed regarding the government's initiatives and awareness concerning e-learning in Balochistan's HEIs. The study highlights the transformative potential of e-learning while emphasizing the necessity for increased proactive government involvement and support to fully realize its benefits in the region.

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**Challenges Associated with the Digital Transformation in Higher Education Institutions (HEIs) in Balochistan**
*Table 5*
*Challenges Associated with the Digital Transformation in Higher Education Institutions (HEIs) in Balochistan*

| Theme | Subthemes | Sample Codes | Supporting Quotations |
|---|---|---|---|
| **Challenges Associated with the Digital Transformation** | **Technology Bottlenecks** | Technological advancement Critical Issues relating to online learning | "-----It is very difficult for the universities of Balochistan to achieve technological advancement for the running of the online classrooms" (EMR1). "----- Our Higher Educational System is facing with many critical issues, such as availability of well-trained faculty members, uninterrupted internet, etc." (EdFR2). |
| | **Institutional Preparedness** | Preparedness Traditional Educational System | "----Undoubtedly, there was a lack of preparedness by the universities of Balochistan, to welcome the digital transformation amid and after the Covid-19 Pandemic" (EdMR3). "----Digital transformation is a very new phenomenon for the higher education Balochistan, as the institutions are habitual of traditional face-to-face learning" (EnFR1). |
| | **Academic Integrity** | Variety of Assessment Tools Online Learning: Frustration and Confusion | "--- Online learning has introduced variety of assessment tools to judge the performances of students that is a tough task for the faculty members including me, to understand and apply " (MSFR1). "---- Most of the faculty members have believed that sudden inclusion of online learning in Higher Education Institutions |

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| | | |
|---|---|---|
| | | (HEIs) in Balochistan has created frustration and confusion. ” (CFR1). |
| **Digital Divide** | Gap of Availably and use of Internet Devices Internet penetration in Balochistan | “--- In my opinion, with in the period, the faculty members and students are covering the gap of digital devices availability and their usages” (EFR2). “---Still our resources and capacities are not enough to bridge the gap of internet devices availability and their usages” (EMR3). “----I considered the demography and tense situation of province as the leading factors that halting internet penetration in Higher Education Institutions (HEIs) in Balochistan ” (MSMR2). |

The findings obtained by examining participant faculty members' opinions on the challenges associated with the digital transformation in Higher Education Institutions (HEIs) in Balochistan are presented above in Table 4.

When Table 4 is examined, where the responses of the participant students are grouped under four sub-themes: technology bottlenecks, institutional preparedness, academic integrity, and digital divide. The responses pf faculty members mentioned the challenges and opportunities associated with embracing technological transformation. Among challenges, most of the respondents were accepted that for higher education Balochistan, achieving technological advancement is a big deal and there were issues of internet and well trained teachers as well. Similarly, lack of preparedness and culture of traditional form of education have appeared as challenges as well. Additionally, the respondents have identified the availability of digital devices and internet penetration as other challenges attached with technological transformation. On the contrary, the participants acknowledged that, e-learning through digital transformation, have provided variety of tools for the educators to avail educational opportunities.

The responses received from faculty members underscored the significant impact of the COVID-19 pandemic in creating educational opportunities for both students and academics. E-learning was acknowledged as a global platform that transcends physical boundaries, providing flexible learning alternatives and facilitating access to international educational opportunities. However, some concerns were expressed regarding the government's initiatives and awareness concerning e-learning in Balochistan's HEIs. The study highlights the transformative potential of e-learning while emphasizing the necessity for increased proactive government involvement and support to fully realize its benefits in the region

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## 4. DISCUSSION AND CONCLUSION

The research, titled "Embracing Digital Transformation in Higher Education Institutions (HEIs) in Balochistan during the COVID-19 Era," meticulously examines the responses of students and faculty members in Balochistan concerning the pivotal role of digital transformation in Higher Education Institutions during the COVID-19 pandemic. The results illuminate a prevailing harmony and understanding among participants on various indicators, with a consensus emerging on the positive impact of digital transformation. Notably, a majority of respondents acknowledge that digital transformation has significantly elevated the quality of higher education, transcending traditional classroom boundaries. Moreover, the research underscores how digital transformation has empowered higher-level students with the flexibility to tailor their learning experiences based on personal preferences. It has also ushered in a diverse array of tools for both students and faculty members to utilize for educational and assessment purposes.

However, the study uncovers a spectrum of opinions and challenges on several fronts. These include concerns about faculty members' skills and capacities related to e-learning, issues stemming from technological advancements, challenges associated with online learning, and the frustrations and confusion attached to the online educational environment. Additionally, a noteworthy gap is identified between the availability of internet access and digital devices, presenting a potential hindrance to the widespread adoption of digital education in Balochistan. These findings align with existing research, such as Phaet et al. (2019), which underscores the substantial contribution of digital transformation to the quality of teaching, learning, and research. Similarly, the work of Qazi et al. (2022) supports the notion that digital transformation, particularly the introduction of e-learning during the COVID-19 era, has integrated university education, providing enhanced educational opportunities.

Despite the positive impact, the study also reveals a nuanced perspective on potential bottlenecks, introducing a layer of complexity to the digital transformation landscape. This nuanced understanding is echoed in the works of Akram et al. (2021) and Hamdan and Aomori (2020), emphasizing the challenges faced by faculty members in adopting suitable educational strategies and assessment methods. The results of the study carry significant theoretical and practical implications. On a theoretical level, the research contributes to the academic review of literature by shedding light on the role of technological transformation, specifically in the form of e-learning, in shaping higher education in Balochistan. It delves into the associated challenges and opportunities, providing a comprehensive understanding of this paradigm shift.

Moreover, the research encapsulates the experiences and opinions of students and faculty members, capturing the nuanced positive and negative effects of integrating with digital transformation. This insight serves as a valuable guide for higher education stakeholders in Balochistan, offering a roadmap for leveraging educational opportunities in an increasingly digital landscape. Overall, the study enriches the discourse on digital transformation in higher education, offering a comprehensive view of its impact in the unique context of Balochistan during the challenging COVID-19 era**.**

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**4.1 Conclusion**

In conclusion, the research titled "Embracing Digital Transformation in Higher Education Institutions (HEIs) in Balochistan during the COVID-19 Era" provides a thorough examination of the responses from students and faculty members in Balochistan regarding the role of digital transformation in higher education during the pandemic. The findings reveal a consensus among participants on the positive impact of digital transformation, elevating the quality of education and providing flexibility for higher-level students. However, the study highlights challenges, including concerns about faculty members' skills, technological issues, and disparities in internet access and digital devices. Despite its positive impact, the research presents a nuanced perspective, aligning with existing literature and emphasizing the complexities faced by faculty members. The study contributes significantly to the theoretical understanding of technological transformation in higher education in Balochistan, offering valuable insights for stakeholders navigating the digital landscape during the COVID-19 era.

**4.2 Recommendations**

Based on the findings and conclusions following recommendations are suggested for the concerned stallholders.

**1)      Recommendations for the Universities**

➢        It is highly recommended that the Higher Education Commission of Pakistan form a concrete knowledge-based plan to create more online learning opportunities for educators.

➢        The crisis underscored the value of global collaboration. Universities should actively seek opportunities for international cooperation, whether in research, student exchange programs, or joint initiatives.

➢        Clear and effective communication is crucial during a crisis. Universities should have well-defined communication plans to keep students, faculty, and staff informed about changes, protocols, and support services.

➢        Embrace hybrid learning models that combine in-person and online elements. This approach provides flexibility and ensures continuity in the face of disruptions.

➢        Ensure that online learning is accessible to all students. Implement inclusive practices and provide necessary accommodations to create an equitable learning environment.

**2)      Recommendations for Higher Education Commission of Pakistan:**

➢      The Higher Education Commission of Pakistan must introduce need-based digital learning programs for academicians and students at higher levels so that they will avail equal educational opportunities at the national and international levels and build and strengthen their digital leadership skills.

➢      It is the need of time for the Higher Education Commission of Pakistan to make a comprehensive paradigm shift from physical education to e-learning, to cope with the international community.

➢      Faculty members and students in universities in Balochistan must be encouraged towards e-learning, to gain more opportunities in new technological-oriented forms of education and to improve their digital leadership skills.

**3)      Recommendations for the University's Faculty Members:**

➤ It is recommended that a blend/hybrid form of higher education system should be introduced and implemented in Higher Educational Institutions (HEIs) in Balochistan, because of its demographic and economic diversification.

➤ Faculty members and students in universities in Balochistan must be encouraged towards e-learning, to gain more opportunities in new technological-oriented forms of education and to improve their digital leadership skills.

➤ Faculty members should be prepared to adjust their teaching methods, course formats, and assessment strategies to accommodate online and hybrid learning.

**4) Recommendations for University Students:**

➤ Faculty members and students in universities in Balochistan must be encouraged towards e-learning, to gain more opportunities in new technological-oriented forms of education and to improve their digital leadership skills.

➤ Students must learn to adapt to changes in learning environments. Develop resilience to cope with uncertainties and unexpected challenges such as the pandemic. Flexibility is a valuable skill both academically and personally.

➤ It is recommended that students should enhance their digital literacy skills. Familiarize themselves with online learning platforms, collaboration tools, and other technologies that facilitate remote learning.

**5) Recommendations for Government:**

➤ It is also recommended that the government of Pakistan must consider e-learning as the future form of education and arrangements should be made to integrate it into the future educational plan.

➤ The government must ensure the availability and continuity of the facility of digital communication, to ensure advanced forms of e-learning.

➤ It is recommended that the government of Balochistan must ensure to build a state of the art digitalized classrooms at Higher Educational Institutions (HEIs) in Balochistan, to meet the dire needs of students and academicians.

**6) Recommendations for the Parents**

➤ Encourage your child to develop flexibility and adaptability in their education journey. The ability to navigate changes and uncertainties is a valuable skill in the current environment.

➤ Maintain open communication with your child about their concerns, challenges, and aspirations. Understanding their perspective will help you provide better support.

➤ Support your child in becoming technologically literate. The pandemic has accelerated the adoption of online learning, and being comfortable with digital tools is essential for success in higher education.

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