

Adapting the Higher Education through E-Learning Mechanisms—A Post Covid-19 Perspective

Abdullah Alsabban¹, Rana Muhammad Shahid Yaqub², Anita Rehman²,
Muhammad Zafar Yaqub^{1*}

¹Department of Business Administration, Faculty of Economics & Administration, King Abdulaziz University, Jeddah, Saudi Arabia

²Department of Marketing and International Business, The Islamia University of Pakistan, Bahawalpur, Pakistan
Email: *mzyaqoub@kau.edu.sa

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Abstract

The prime purpose of this research has been to identify and highlight the issues, challenges, and problems faced by educational institutions in carrying out their academic activities during forced lockdowns attributable to the COVID-19 outbreak. A systematic literature review of scholarly papers mined from the ProQuest and ScienceDirect databases using David & Haan's (2003) methodology has been conducted. While appealing to the Technology-Organization-Environment framework, we have identified many technological, organizational, and environmental factors affecting E-Learning platforms' prosperous adoption and implementation to fight the issues, challenges, and problems emanating from the global pandemic. Besides, several remedies have been identified and proposed that could enable higher education institutions to deal with all such challenges. Besides expanding our understanding of the dynamics of institutional adoption in HEI, the paper offers some helpful practical implications that could be instrumental in enabling an effective adaptive response to the disruptions caused by global pandemics, which always have a significant chance to recur in the future.

Keywords

E-Learning, COVID-19, Strategy Formulation and Implementation, Technology Adoption, TOE Framework, Government Support

1. Introduction

Individuals and institutions face challenges due to COVID-19, including salary

reductions, layoffs, heightened stress, reduced life satisfaction, etc. These devastating effects have transcended industries around the globe, adversely affecting their economic and socio-cultural domains of life in both developing and developed nations, making especially the former susceptible to recessions (Maatuk et al., 2021). The economic downturn resulted in GDP loss, and the ensuing detrimental effects were quite evident across the globe (Kohlscheen et al., 2020). The prodigious challenges have caused an immense impact on employees' working across industries related not just to health but have triggered poverty and inequalities at the global scale. To overcome these challenges triumphantly, organizations need an eccentric adaptation of their systems, processes, and procedures. This becomes especially difficult without prior readiness for such a massive change and a lack of strategic and/or operational flexibility. However, despite such devastating huge impacts on the economy and social domains, the adoption of alternative strategies, primarily to conduct operations, remained a severe challenge, specifically in the absence of organizational capabilities for technology-driven solutions, which are precursors to effective organizational adaptation to change in this digitization and knowledge-driven age. This inability proved to be quite inimical to the productivity, welfare, and well-being of employees at the workplace, where the adversaries of technostress became utterly visible to individuals' productivity and performance (Chakraborty & Kar, 2021).

The sudden pandemic also became a bolt from the blue for the higher education sector. Adopting the learning processes in digital format using eLearning platforms (e.g., Blackboard, Moodle, Zoom, MS Teams, etc.) has been considered a panacea. Still, its successful operationalization was hampered for multiple reasons; the lack of preparedness of stakeholders like students, teachers, administrators, etc., remained the prime source of difficulties (Lindqvist, 2019). Implementing digital learning platforms for educational activities for both participants required prior skills and abilities, appropriate technological infrastructure, and preferences of individuals and groups to harvest the learning outcomes during and after the forced closure of HEIs (Apiola et al., 2019). Adopting digital learning and implementing other technological-based applications reduced the arduous requirement of physical interaction among course instructors and students but created various other challenges for all stakeholders to actualize desired performance outcomes (Chakraborty & Kar, 2021). Consequently, a dire need arises for both researchers and practitioners to enumerate these challenges and find productive means to deal with the obstacles inherent in realizing desirable performance outcomes through the effective adoption and integration of eLearning platforms into the management of learning processes.

Though plentiful studies that aimed to account for the challenges inherent in the successful adoption of eLearning platforms by HEIs have been conducted, the relevant context has usually been the developed world. Consequently, significant research gaps exist to explore such practical issues, challenges, and problems in developing countries such as Pakistan, where the impact has been much

more severe. The teachers and students seemed reluctant to adopt digital platforms for educational activities in the earlier stages of the pandemic, and paradoxically, they were not willing to return to the physical mode of education post-pandemic, primarily due to the ease of passing exams attributable to cheating during online exams. This minacious behavioral shift could have a long-lasting effect on the students, ultimately undermining the quality of education. Such complications in the education sector have occurred due to the pandemic. Still, these may happen due to other potential threats, including novel pandemics, wars, terrorism, floods, or organizations' preferences to shift online to harvest cost reduction benefits and extend the wings beyond borders through online platforms. Many universities worldwide have switched partially or fully to online learning, and the danger of many others becoming digital universities is looming. Realizing a dire need to address these issues, this research addresses the following research questions.

- 1) How has the COVID-19 outbreak affected the education sector?
- 2) What issues, challenges, and problems have the higher education sector faced?
- 3) What might be the effective mechanism for efficient e-learning education while considering the digitalization of the higher education sector?
- 4) What is the efficacy of eLearning platforms in mitigating such challenges?
- 5) What possible factors must be considered for devising the strategies to meet the issues, challenges, and problems inherent in successfully implementing technological solutions?

The insights gained from this study could profoundly help devise effective e-education strategies during disruptive situations like the COVID-19 pandemic. The intended contribution of this study is manifold. First, it aims to identify and highlight the challenges, issues, and problems the higher education sector faces that are explicitly related to participants' behavioral change, especially after the forced shift to online learning mode. Second, it sought to address the behavioral change of participants in the education sector during and after the lockdown faced by education institutes when utilizing technological-based applications for education purposes. Third, it aims to identify and enlist the effective potential possible strategies to be adopted by the education sector to overcome the issues, challenges, and problems associated with a forced shift to online learning and a permanent online change in the future. Finally, it endeavors to provide suggestions to decision-makers to devise effective strategies for the successful adoption and implementation of digital technologies in the education sector, especially in developing countries, to overcome the problems and reduce the behavioral change that negatively impacts the quality of education.

The subsequent section of this paper is divided as follows: The following section presents a general discussion on the impact of COVID-19 on higher education. The third section outlines the methodology of this study. Section four presents an extended discussion on the issues, challenges, and problems inherent in

adopting and implementing eLearning platforms, along with a proposed framework for dealing with these challenges. The last section presents limitations and suggestions for future research, concluding the discussion.

2. Literature Review

Institutional decisions and their associated models are increasingly affected by the digital transformations proliferating with evolving technologies (Berghaus & Back, 2016; Zott & Amit, 2017). Consequently, enhancing communication and collaboration between actors has become quite convenient by galvanizing interconnectivity through smart devices, machines, and platforms. These technologies enable shared and standardized data input for real-time stakeholder cooperation. Timely adoption and successful integration/implementation of these digital technologies could help organizations deal with challenges from environmental uncertainty caused by expected or unexpected events such as pandemics (Rogers, 2003; Waldron et al., 2020). Digital platforms are one such technology that has proved its efficacy during COVID-19.

2.1. Digital Platforms

Besides structure and culture, technology is another central pillar in the learning/knowledge infrastructure, enabling and driving learning processes (Gold et al., 2001). Both studies by McAfee (2006) and Paroutis & Saleh (2009) stated that companies may utilize apps for interactive digital platforms to make it easier to see how their staff are participating in knowledge-sharing activities and transactions. The usage of social media platforms like online discussion forums, email list servers, blogs, electronic bulletin boards, and wikis enables individuals who have similar interests, backgrounds, and aspirations to communicate with one another and share information (Cheung et al., 2011; Lin, 2007; Yaqub & Alsabban, 2023a). Moreover, the development of information technology has led to new electronic methods of knowledge sharing through online platforms such as forums, social networking, and social media (Nguyen, 2020). According to Kaplan and Haenlein (2010), social media is a collection of internet-based technologies that expand on the ideological and technological basis of Web 2.0. As a result of the internet and mobile electronic devices, social networks are increasingly used (Korhan & Ersoy, 2015; Kwayu et al., 2021). Digital and social platforms can help stakeholders communicate and collaborate more effectively by facilitating prompt knowledge sharing and retrieval (Lee, 2017; Lin, 2007).

Many organizations, including HEIs, have used social technologies, including digital platforms, in the past few years to create meaningful opportunities for knowledge creation, collaboration, and sharing between stakeholders-students, faculty, and administrative staff are the stakeholders in higher education institutions (Chatterjee & Bhattacharjee, 2020). eLearning platforms like Blackboard, Moodle, MS Teams, Skills Share, etc., have been progressively used during and after COVID-19 for the management of courses, and digital and social media plat-

forms like ResearchGate, Academia.edu, Google Scholar, LinkedIn, Facebook, YouTube, Zoom, etc. have been widely used by researchers for knowledge creation, knowledge collaborations, and knowledge sharing. Despite a higher instrumentality, how digital and social media platforms can improve higher education institutions' knowledge and learning management processes has not been adequately explored (Chatterjee & Bhattacharjee, 2020). Through this research, we seek to bridge this critical research deficiency. The relevant context of the study has been the HEIs of Pakistan, which sought to vigorously adopt the eLearning platforms to fight out the challenges stemming from the pandemic control measures taken by the government, despite all the odds in terms of (financial) resource deficiency, lack of digital readiness of both the teachers and the students, lack of enabling digital infrastructure, and a perceived higher inertia to switch to the modernized modes of learning. A neglect in the contemporary literature and all these impediments make it an interesting context for this study.

2.2. Theories of Technology Adoption

Adoption theories explain how individuals participate in a new activity for the first time. According to the Theory of Reasoned Action (TRA), individuals decide whether or not to embrace a habit or technology based on their ideas about its effects (Wallace & Sheetz, 2014). Using the TRA, one may comprehend the adoption of behaviors, technologies, or recommendations. A host of theories and models have offered significant insights into understanding the adoption of new technologies; however, two of them, namely the Technology adoption model (TAM) and the Technology-Organization-Environment Framework (TOE), exhibit a more significant potential to explain the (individual and institution level) dynamics of adoption of digital platforms by HEI and have therefore been used as the background theories in our conceptualization.

According to the Technology Acceptance Model, an individual's desire to adopt a (digital) technology is guided and determined by two distinct beliefs: perceived ease of use and perceived utility. An IT system's perceived ease of use is the degree to which users believe it to be easy to use (Thong et al., 2002). Perceived usefulness refers to how IT users feel an IT system would improve their work performance (Thong et al., 2002). A person will embrace technology, service, or habit if it improves their performance without demanding significant effort (Davis, 1989; Thong et al., 2002). In addition, TAM hypothesizes that perceived utility influences perceived intention to use, while perceived ease of use influences perceived intention to use or to adopt an IT. Therefore, perceived ease of use indirectly and directly impacts perceived intent to use (Thong et al., 2002). According to (Davis, 1989), a person will embrace technology, service, or habit if it improves their performance without demanding significant effort. Numerous studies demonstrate the reliability and validity of the perceived ease of use factors and perceived usefulness of the TAM, including those by (Doll et al., 1998) and (Hendrickson et al., 1993).

TOE framework (Tornatzky & Fleischer, 1990), while seeking to explain the dynamics of organizational adoption of technology, elaborates upon the interplay of technology characteristics, environment, and organization in facilitating technology adoption. All the technologies showing relevance to a specific organization are contained inside a technological setting, including all the ones that are being applied or are still emerging within the organization. Existing technologies may gauge how quickly an organization can adapt to technological developments, whereas emerging technologies demonstrate how technology can help organizations grow and evolve. Different characteristics of an organization, like its size, intra-organizational communication process, and degree of centralization, are comprised under the organizational context (Chau & Tam, 1997; Tornatzky & Fleischer, 1990). Innovation is positively affected based on the association between an organization's subunits, which impacts the implementation and acceptability of innovation. According to (Baker et al., 2011), the adoption phase is suitable for decentralized and organic organizations as they focus on their teams and maintain lateral communication. At the same time, the implementation phase is best suited for the mechanical structures, emphasizing maintaining formal relationships and defining roles.

2.3. Technology Adoption in HEIs

The education sector has become much considered for its survival and sustainability, and adopting technology and online platforms for educational activities has become a significant challenge for higher education participants, including educators, students, policymakers, and guardians. The change in education patterns due to the emergence of online platforms plays a vital role in such crucial circumstances where the institutions strive to harvest the benefits by reducing the negative consequences while promoting sustainable and flexible research development programs (Fissi et al., 2021). The institutions instituted various policies and efforts during the lockdown, and for the greening aspect, which is considered as one of the opportunities identified during lockdown to reduce the carbon emission and human crowd. The online platforms for education purposes require safety, security, culture, and organizational management considered as indicators for organizational structure, the development of curriculum, operations and health and safety for the teaching and learning process, the involvement of participants, the financial support and governance are reported as essential issues and problems. Particular challenges have been considered for the health and education sector in emerging economies, explicitly maintaining good health and well-being and ensuring the quality of education; to achieve this, particular strategies support flexible and convenient educational strategies (Barteit et al., 2020). The dramatic changes occurred during the COVID-19 pandemic, and many social dilemmas, including academic fields, have arisen (Blundell et al., 2020). This study intends to highlight the challenges of the education sector and suggest the strategies to be adopted for successful e-learning in the higher

education sector.

3. Research Methodology

We used David & Han's (2003) approach to conduct a literature review, searching for relevant articles through mining two databases, i.e., ProQuest and ScienceDirect, using representative keywords such as *e-learning*, *Covid19*, "strategy formulation," "strategy implementation," "technological equipment," "technology adoption," and "government support" to find the relevant literature. Only papers written in English and published in peer-reviewed journals only until the end of November 2022 were considered. The initial pool of papers was delimited by reading the abstracts of these papers and dropping those that did not seem to have significant relevance to the objectives of this research. Additional papers were added following the snowball method (Yaqub & Alsabban, 2023b). **Figure 1** summarizes our research methodology.

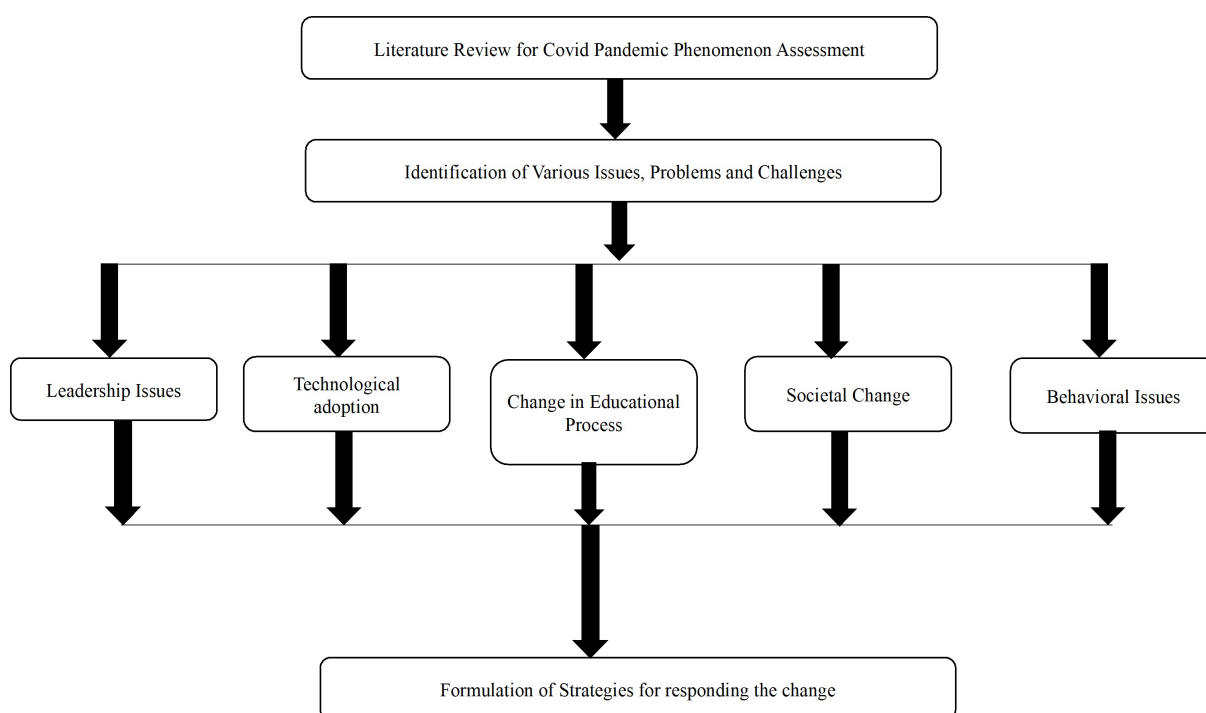


Figure 1. The Model & the Methods. Source: Authors' own work.

4. Results and Discussion

4.1. Issues, Challenges, and the Problems

The education sector has faced the worst situation during COVID-19, and several educational institutes faced permanent closure. The majority of the students confronted negative impacts and discontinued their academic success. Low-income countries faced the worst situation during the COVID lockdown, and approximately 40 million students were cut off from the educational process due to the limited adoption of tech applications (Emon et al., 2020). Low-income countries

faced longer lockdowns due to a lack of resources, which negatively impacted the academic industry; on the other hand, the students were excited to be admitted to the higher education sector at the national and foreign levels. The number of institutes offering virtual classes have faced challenges, including poor internet connection, poor network speed, high prices, internet data, and intelligent gadgets; therefore, students face obstacles during online education and family crises; it has been stated that if the resources are not upgraded, then education industry has the potential threat of failure and get into further turmoil. This research effort concentrates on the emerging problems faced by the education industry during the online education process for utilizing the latest advanced technological applications to maintain social distance and health issues. Significant uncertainty in the educational sector has been observed due to the lockdown, and most of the institutes permanently closed down as 60% of students were impacted due to the outbreak from pre-school to tertiary level education; the government policymakers should focus on the development of strategies and adoption of such learning patterns that adaptable for participants (Singh, 2020; Nicola et al., 2020). Many problems have emerged due to the lack of technological resources, the behavioral issues in managing the mental well-being of the students, the appropriate balance between multimedia and traditional teaching patterns, the focus on technology development, and the required infrastructure (Donitsa-Schmidt & Ramot, 2020; Raju, 2021).

The users have stated that e-learning platforms are easy to utilize and ensure easy management for learners and access to teachers and teaching material (Gautam, 2020; Mukhtar et al., 2020). Online learning was found to be helping in reducing the effort and travel costs for participants and operational costs at the organizational level. The administrative cost was significantly reduced through e-learning and the preparation of recorded lectures, attendance, and leaving classes, which were controlled and beneficial. The online learning methods have encouraged the participants, including teachers and students, to adopt such applications for educational purposes during complex circumstances that physically cause hurdles in approaching the institutes. The research scholars have identified issues by criticizing the online learning pattern due to its limited functionality, such that participants may learn online theoretical knowledge but need to gain more practical skills. Face-to-face interaction is eliminated, which also causes educators and learners to need more interest and progress. Furthermore, there is the challenge of online assessment through the development of objective-type questions; the security and reliability of online programs have also been questioned due to the misuse of technology (Mukhtar et al., 2020).

The education provided online through web applications, digital learning and interactive learning, computer-based teaching, and the internet-based educational pattern widely known as e-learning has potential benefits and drawbacks. The emergence of technology has assisted the academic sector in initiating and providing an online web-based education system that has increased rapidly

while fostering cost reduction through implementing these technologies expressed by Aljawarneh (2020) and extending the wings to remote locations. Various universities have recognized the importance and significance of e-learning, and the electronic means of education have been considered a core element of the current education system. It has been stressed that research should be conducted to identify issues, challenges, problems, and advantages of e-learning in the higher education sector that negatively or positively affect the education quality and delivery of educational material to potential candidates. The education sector is supported by a technological-based mechanism for knowledge content generation and educational material to educate the learners, share knowledge, enrich their skills and abilities, and further administer the courses in the organizations. Technological utilization enhances the effectiveness of knowledge, skills, and abilities, enabling organizations or educational institutes to process massive amounts of data through effective collaboration and strengthening learning sustainability. Electronic means of learning allow academic institutes to enhance the quality, leading to performance-related outcomes. Research studies have been conducted previously that stated that certain websites may crash due to heavy usage for e-learning and restrictions of the domain for practical knowledge. Further, the major drawback of online learning is the absence of personal interactions between teachers, students, and, specifically, fellows, which limits knowledge generation, utilization, and sharing (Maatuk et al., 2021).

Developing countries come across various challenges and issues in adopting and utilizing technology-based applications for e-learning due to poor and insufficient internet facilities, inadequate and inappropriate knowledge of information and communication technologies, and weaker content to be delivered. The educationists and stakeholders, including students, teachers, and administrative employees, have issues sharing content and information through video content and advanced applications observed to be new in higher education and first-time usage for educational activities (Lara et al., 2019; Lizcano et al., 2019).

Several studies have been conducted to reveal the opportunities and challenges faced by various institutes while transitioning from traditional to e-learning. The literature has stated that the lack of well-preparedness and readiness to adopt e-learning at a massive level are reported as significant reasons. The study also examined the challenges faced by students while dealing with e-learning during the outbreak. It highlighted the need for students to be more ready to adopt web-based applications for educational activities (Aboagye et al., 2020). The research scholars have concluded that there must be a blended approach combining the traditional and e-learning approaches to shift educational activities entirely online and web-based. The research studies have explored the e-learning processes among familiar students with advanced self-study skills, a basic need for the booming online education (Radha et al., 2020). The benefits, characteristics, drawbacks, and features of e-learning have been investigated, and various factors in the literature, including demographic factors, the behavior of employ-

ees, and cultural background, impact the education level of the students in the e-learning domain. There is a need to develop an effective e-learning curriculum design and method to teach students while understanding the features of educational learning. The studies have highlighted that students and scholars expect outcomes from learning management systems; the research has been conducted on students of Lebanon and England to apply e-learning systems during covid19 lockdown. The research scholars have addressed the effectiveness of e-learning for students at higher education levels. The study was conducted on 700 students, and 94.9% utilized the e-learning platforms, tools, and techniques (Maatuk et al., 2021).

The literature states that there is a need to motivate students to learn e-learning due to the complexity and challenge of the online education system. The participants have identified that the need for more adoption of e-learning mechanisms and face-to-face contact leads to dissatisfaction. The student's satisfaction may be gained by allowing them to conduct online assessments that may motivate them toward educational activities. Another study conducted on students of Tehran Alzahra University revealed that there must be various important considerations before initiating e-learning; the study was limited in cultural perspective, so generalization was not suitable (Harandi, 2015). The research scholars have elaborated on the e-learning phenomenon, suggested various guidelines and suggestions to increase the educational field's effectiveness, and highlighted e-learning's advantages. The study reported that students were willing to learn online with less social communication with other students or lecturers. The study elaborated on the characteristics of teachers and students, the structure of the technology, and institutional support; the researcher reported that these factors are critically crucial for organizational e-learning success (Jethro et al., 2012).

Previously, various research scholars discussed the importance and significance of e-learning and their advantages and disadvantages. Modern teaching has the potential and higher probability than traditional classroom teaching. The studies have focused on adopting modern IT-based learning that assists in overcoming the issues and challenges of problems faced by the participants (Goyal, 2012). Another study predicted a situation where e-learning may become essential, and a variety of e-learning skills might be demanded from participants; therefore, a blended approach of online learning and physical learning was considered for effective outcomes. The researchers explicitly considered the issues of management perspective, intra-institutional managerial perspective, services and arrangements, quality of education, and quality assurance, as most organizations have considered e-learning-related similar problems (Gaebel et al., 2014).

The study has depicted the role of the outlook design of online lectures in determining the e-learning effectiveness and performance of teachers, which must be considered to pursue online learning successfully. The instructors' skills and presentation ability to attract students to online platforms are central to the suc-

cess of e-learning programs in the higher education sector. The success of e-learning depends upon the design of online lectures, which impacts lecturers' performance and satisfaction (Yengin et al., 2011). The study assessed e-learning effectiveness by reviewing articles from several journals, websites, and book chapters to categorize the results. The analysis of previous studies depicts that e-learning has multiple advantages that fulfill the requirements of individuals and further produce positive effects on learning. E-learning is influential and has a substantial impact on learning and education. Educational institutes have developed potent grounds for effective e-learning patterns for enhancing performance (Somayeh et al., 2016).

The closure of educational institutes at all levels due to the outbreak left long-lasting adverse impacts on students' well-being, social issues, and economic downturns. The importance of education can never be overlooked, even during unwanted and extreme circumstances. Therefore, there has been a dire need for potent interventions to bring virtual education facilities to children during institutional (physical) closures (Reuge et al., 2021). It has been observed that the learning crisis and skills gap have increased significantly as millions of young students cannot develop the required skills and fail to contribute to economic and community development. However, the quality of education has been sacrificed during the pandemic, and several educational institutes have failed to provide online services, causing adverse psychological effects on the students (Education Commission, 2021). We summarized the factors behind this failure into five categories, which will be discussed in the following section.

4.2. Leadership Dilemma in the Education Sector

Leadership in the education sector has a significant role in the success of educational institutes, ensuring education quality, effectiveness, and continuous improvement (Yaqub & Alqahtani, 2015). Sustainable education leadership enables the organization to commit to higher academic quality and support the teaching and learning process to achieve objectives and goals. Educational leaders inspire many students as they leave their legacy; they possess the capabilities to manage the educational system through effective communication. The seven principles have been stated for sustainable leadership including sustainable leadership enables organizations to create and preserve sustaining learning, sustainable leadership secures success, supports leadership for others, addresses issues of social justice, ensures the development of human and material resources and environmental concerns, further sustainable leadership enhances the organizational capacity. It provides employee engagement (Amanchukwu et al., 2015). Based on the literature, the current study argues that COVID-19 or similar situations require effective and progressive leadership in the education sector to devise successful strategies for implementing technological-based solutions to provide education effectively. Adopting technology and altered ways of delivering education are firmly based on the practical and timely decision-making of leaders in organizations,

such as the initiatives taken for online learning influenced by the leaders.

4.3. Technological Adoption of E-Learning

The Indonesian Education Minister issued a policy for education institutes to prevent the spread of the virus by imposing lockdowns, and the development of infrastructure was encouraged to initiate the online learning process while ensuring the facilities required (Batubara, 2021). The education system, from kindergarten to tertiary level education, faced issues and challenges in implementing technological solutions for effective communication for online learning. It was once adopted due to a forced shift to online learning. Still, later, a similar situation may arise, including natural disasters, and the education sector has to adopt innovative online learning mechanisms to deliver the lectures and engage the students with educational activities through practical, interactive sessions. This was a sudden change in the education sector, with both participants adopting online learning instead of conventional educational activities, as the pandemic significantly impacted and damaged world organizations (Batubara, 2021).

4.4. Societal Change

It has been observed in history that crises and disasters can reshape society (Badghish et al., 2022, 2024), and the devastating impacts of COVID-19 have played a significant role in reshaping society as the global pandemic restricted various activities and accelerated emerging innovative and advanced practices in the digital sphere. The education industry faced the worst impact due to the closure and shift to online education by implementing various software and online platforms. The digital transformation that has taken place in the education sector has attracted the attention of researchers. Still, researchers have faced several issues and challenges in providing the services and sustaining the quality (Kang, 2021). The different countries had different resources and approaches to meet the pandemic. They ended up with other stories and diverse patterns of handling and controlling the impact of COVID-19 that depend on policies implemented by the government to prevent the rapid spread of the virus and to mitigate its effects (Lee, 2020). The close-down policy governments imposed globally impacted the education sector worldwide, turning the education world around. 100% of institutes have initiated their online activity to continue their educational activities.

4.5. Change in the Educational Process

The pandemic severely impacted all segments of life, including tourism and travel, and the spread of COVID-19 upended the higher education sector. The research scholars have identified multifarious changes to be adopted in higher education under five categories: 1) the continuation of teaching and research activities, 2) maintenance of employment of students or likely to be employed, 3)

the sudden shift in process of education, the behavioral change and requirement of new resource development, 4) affordability of education, the working models of higher education acceptable for parents and students, 5) the changes at macro-level for regulation to facilitate the higher education in changing scenario. It has been stated in the literature that the pandemic caused risk increase in colleges and higher education due to closure and has to face budget cuts adjustments, which is a painful process to shrink educational activities; similar drawbacks have been met by the Malaysian education sector where 50% of local and 70% international students faced issues with online learning and educational activities. The Malaysian private education sector and financial lack have met the trading loss of 44% (Tamrat, 2020).

4.6. Adoption of E-Learning

It was evident that approximately 91.3% or 1.5 billion students worldwide could not participate in learning activities due to forced lockdown; the Indonesian government stated that 45 million students in Indonesia could not join in the online learning process (Goldschmidt, 2020; Batubara, 2021). The massive change in the teaching and learning process was adopted as online educational activities were the only solution for both participants, teachers, and students, but without proper preparation to carry out the learning activities found to be tough and faced several issues, challenges, and problems, the behavioral change was evident among the students when re-switching to the physical mode (Bao, 2020; Basilaia & Kvavadze, 2020). The shift in the education process was adopted worldwide as no other alternative was available, only to take lectures from their hometown to pursue teaching and learning activities, believing that online education would be fine for students to pass their degrees on time. Technology usage, however, has increased in the previous decade due to its competitive advantage in adding value to facilities. Information and communication technology (ICT) has transformed routine activities. Technology is considered one of the driving forces behind development and innovation worldwide; the knowledge economy is based on ICT adoption and utilization to gain a competitive advantage. The higher education sector adopted ICT platforms for education purposes that enable students to enrich their knowledge, skills, and abilities by meeting the demands of a rapidly changing environment. The involvement of technology has added value to the learning and organizational management process, which plays a role in the growth and development of teachers and students (Tadesse et al., 2018).

ICT enables organizations to enrich their activities by effectively utilizing capabilities; the nature of skills differs among ICT capacities and generic skills. ICT is considered a universal tool that provides services for academic purposes at the workplace. For effective utilization of ICT equipment, various components include knowledge, instrumental abilities, personal and interpersonal attributes, and capabilities in the specific context (Tadesse et al., 2018).

5. Proposed Framework to Deal with Adoption Challenges

The proposed framework (Figure 2) expands the body of knowledge by highlighting the challenges of e-learning before and after implementation and then the development of such strategies that contribute to the adoption, implementation, and continuation of e-learning that can be adopted for a more extended period or as a permanent solution to initiate online education by freeing the participants from physical location under effective guidelines and control mechanism. The study proposes strategies based on the education sector’s challenges and issues. Further, it suggests developing appropriate methods for the education sector to eliminate the problems encountered during online education. The development, adoption, implementation, and continuation of effective strategies foster the benefits of avoiding issues and ensuring the project’s success.

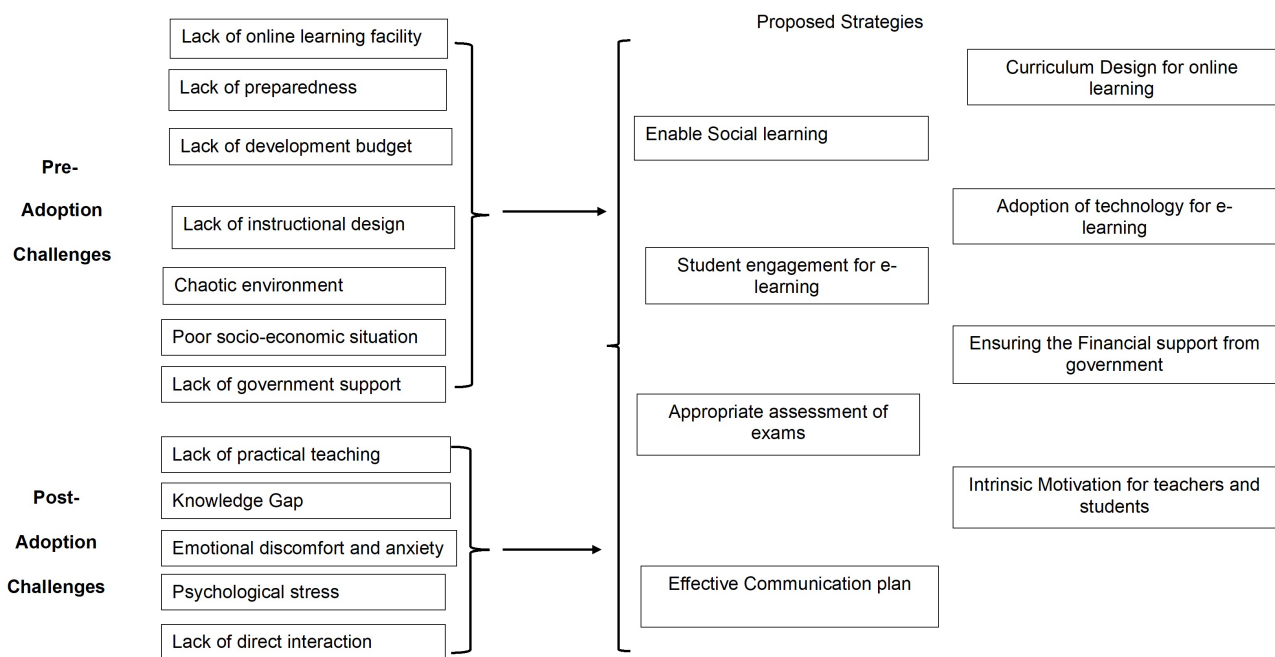


Figure 2. Pre & Post Adoption challenges. Source: Authors’ own work.

1) The appropriate curriculum design is required for e-learning, as the education mode is quite different from the physical mode; the curriculum has to be upgraded and delivered, as the issues have been observed due to practical education. Online learning faces limited functionality where physical interaction with equipment is required. However, a simulation approach may be utilized for particle exposure.

2) The scope of social learning has recently increased due to the increased usage of online applications and social relations; the social exchange theory also posits acquiring knowledge and experience from social and exchanging mutual benefits. The educational institutes should be able to adopt social platforms to engage the students and to share knowledge among participants.

3) The appropriate equipment is required for e-learning, and the institutes must be able to adopt the latest online equipment that contributes to the implementation of e-education programs that serve as a platform for participants.

4) One of the major problems faced by educational institutes was the need for more interest from students and the higher level of reluctance of students to remain absent or deviant during online lectures. There is a dire need to develop such a strategy that successfully engages the students either by objective-based, gamification-based, or effective control to engage the students.

5) Implementing e-learning requires large-scale infrastructural changes, such as developing servers, procuring technological equipment, and maintaining valuable equipment. Therefore, financial support from the government is essential and may be utilized to adopt software that addresses the issues and challenges of e-learning.

6) Another prime concern of the educational institutes was to conduct the exams; during lockdown, the students appeared in exams online from their homes. However, the educational institutes showed leniency towards grades, which affected the students psychologically, as the students were reluctant to appear in physical exams due to the security of grades and to cheat the system. The behavioral change was a touch to deal with, as behavioral changes lead towards such negative consequences. Hence, the study suggests that appropriate exam mechanisms must be developed/adopted for the smooth conduct of exams without any chances of bias.

7) The participants must be self-motivated to contribute to the organization's success by fulfilling the tasks. However, the motivational aspect plays a vital role in organizational success and empowerment or online learning, providing large-scale liberty to both prime participants. Therefore, initiatives must create the highest level of motivation among teachers and teachers to share knowledge.

8) Effective communication serves as the backbone of whole planning. It enables the participants to share information and knowledge while overcoming the issue of lack of information or timely availability of required information. Poor communication between participants leads to misconceptions. It misleads decision-making; therefore, there is a dire need to develop a strategy and comprehensive plan for effective communication, as its importance has gained much attention.

6. Conclusion

The substantial impact of COVID-19 has been witnessed in every aspect of life, specifically the education sector, due to restrictions on social gatherings that led to the higher education sector introducing innovative initiatives to the impetus for change in educational sustainability in the turbulent social environment. This situation has never occurred before the education sector had to adopt technology-based sustainable education platforms that had not been experienced before at this scale and sudden change. The wave of the pandemic disrupted the higher education sector, resulting in a global higher education landscape that has changed

dramatically due to rapid spread. The educational industry initiated various remote teaching practices to cope with the uncertain situation of COVID-19, as 91% of all students worldwide were affected due to forced lockdowns and online shifts in educational activities.

Numerous challenges, issues, and problems arise during the online educational process faced by participants in the higher education sector as demand for online learning has skyrocketed. These challenges, issues, and difficulties instigated the demand for online learning, so universities initiated emergency remote teachings, but universities scrambled to provide the appropriate academic continuity. Real-time digitalization has grown in the education sector due to the pandemic and has faced multiple difficult decisions. However, newer opportunities also emerged that must be considered for a future in a similar situation or willingness to adopt the technological education process to grasp the unleashed advantages. This paper's objectives are threefold: identifying challenges of e-learning education before and after the pandemic, developing possible strategies that may be adopted to cope with the uncertain situation, and implementing these strategies permanently to ensure the quality of online education. This research contributes to developing suitable methods for the education sector that must be adopted to improve online education quality in case of any disaster like COVID-19 or willingness to adopt for grasping the mutual benefits. Moreover, future research endeavors are suggested based on potential research questions; the findings of this study extend the knowledge base by providing the possible challenges and issues and further suitable strategies in the context of the effectiveness of online learning in the higher education sector. The successful implementation of the proposed strategies tends to support the online education mechanism for universities.

The study is descriptive, and a systematic literature review is undertaken to devise the strategies. There is a need to identify and develop more strategies that affect the other concerns as well; this study needs to be more extensive in identifying the challenges and devising a plan to overcome the challenges of online learning. Future research should focus on developing a measurement scale for participants' performance, attitude, and behavior from the perspective of COVID-19 or forced lockdown that reflects the forced lockdown approach from the government. Future research may assess the impact of challenges or focus on the challenges and develop strategies to respond to environmental changes and market shifts.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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