



Distance Learning and Academic Performance Evidence from a Qualitative Study

Eman Qadeer

Research Economist
PIDE

Executive Summary

There exists a bi-directionality between education and stability. This notion implies that education accessibility can be inhibited by instability in the system and the other way around is also true. Against this background, it is important to discuss the case of Pakistan since it has transitioned to remote learning in response to the external shocks ranging from COVID-19 to the recent Iran-US conflict.

This knowledge brief examines the challenges experienced by higher education students during remote learning through a review of extant literature and qualitative evidence from focus group discussions (FGDs). The literature says persistent challenges related to digital infrastructure, internet and electricity access, student engagement, academic performance, and the learning environment. The focus group discussions further established how these challenges affect students' concentration, motivation, interaction with instructors and peers, and ability to study effectively from home. Participants also reported household distractions and differences in learning experiences across geographic settings.

All in all, findings suggest that while remote learning facilitates the continuation of academic activities during unusual circumstances, its effectiveness however remains questionable given the regional disparities and unequal learning environments.

Introduction

Government of Pakistan, in wake of the recent regional tensions, announced austerity measures aimed at conserving the energy. This led to the shifting of academic activities to the online mode. This measure, along with other austerity steps, has been revoked following the end of conflict. It is however important to discuss how this event has exposed the vulnerabilities of our education system.

During the recent course of time, educational institutions shifted to remote learning mode on account of the external stimuli such as political unrest, COVID-19, and regional tensions. Therefore, it is imperative to ensure a smooth flow of the academic activities despite the ongoing disruptions – something that requires meticulous planning and effort by the authorities. In case of Pakistan, the educational sector has managed to pull off academic activities in the face of external shocks. However, the challenges such as digital access, academic performance, and home environment persist (Jowsey et al., 2020).

In light of the above-mentioned background, this knowledge brief is aimed at understanding the challenges faced by higher education students while taking the classes remotely. It further reveals how these issues are compromising the students' academic performance.

Theoretical Foundations

The theoretical perspectives of online learning have evolved from behaviourist approaches to learner-centred theories that better explain learning in digital settings. Early computer-assisted learning systems were primarily based on behaviourist theory, which views learning as a change in observable behaviour resulting from external stimuli and reinforcement (Thorndike, 1913; Palov, 1927; Skinner, 1974). Although behaviourism contributed to the development of structured online instruction, such as lectures, quizzes, and assessments, it offers limited insight into the cognitive and social processes involved in contemporary distance learning.

Cognitive learning theory shifted attention from observable behaviour to the internal mental processes related to learning. It argues that learning depends on how learners process, organize, and retain information, with factors such as memory, motivation, prior knowledge, and cognitive effort playing a key role (Craik & Lockhart, 1972; Craik & Tulving, 1975). This perspective is pertinent to distance learning, where students often adapt to unfamiliar digital settings while facing challenges such as unreliable internet connectivity, electricity outages, household distractions, and limited access to learning resources. These constraints may increase cognitive load and impact student's concentration, engagement, and academic performance in general.

The constructivist perspective posits that learners actively construct knowledge by interpreting new information through their own experiences and interactions with others (Cooper, 1993; Wilson, 1997). Learning is therefore enhanced when students can collaborate with peers, communicate with instructors, and apply knowledge in meaningful contexts. During emergency transitions to distance learning, opportunities for interaction and collaborative learning may be reduced because of technological and environmental constraints, potentially affecting students' engagement and learning experiences.

More recently, connectivism has emerged as a theory that explains learning in digitally connected environments (Downes, 2006; Siemens, 2004). It argues that learning occurs through networks connecting individuals, digital technologies, and multiple sources of information. Instead of completely relying on the instructor, learners acquire knowledge by accessing, evaluating, and incorporating information through online platforms and digital communication. This perspective is particularly relevant to remote learning during unusual circumstances including COVID-19, strikes, regional disputes where students' learning experiences may be influenced by access to digital devices, reliable internet connectivity, online learning platforms, and communication with instructors and peers.

Collectively, these theories provide complementary perspectives for understanding remote learning. Behaviourism explains the structured delivery of online instruction, cognitivism emphasizes the mental processes involved in learning, constructivism highlights the importance of interaction and knowledge construction, and connectivism focuses on learning through digital networks and technologies. Together, these theoretical perspectives provide a useful framework for understanding the technological, cognitive, and social issues pertaining to the students' experiences of emergency distance learning in Pakistan.

Literature Review

a) Global Literature

Online courses are different from the traditional courses in several ways. Conducting classes in a face-to-face mode allows the instructor to evaluate the students' level of understanding of class content from non-verbal cues and allows them to modify the lecture to make it more comprehensible. Any queries during the class can be answered instantly which allows for a better understanding of the lecture (Berenson, Boyles, and Weaver 2008). Ideally, students who are academically successful tend to be self-motivated, self-directed, above average communication and technology skills (Dabbagh, 2007). However, not every student possesses all of these characteristics. Since the students differ in learning styles, cognitive abilities, persistence, and their attention span. Moreover, while some of the learners maybe more comfortable with the traditional learning style, there are others preferring online learning. There exists a controversy with regards to the optimum instruction style that can lead to success in online learning. Variables like adequate course/instructional design holds significant importance in the context of online learning – something which should be taken into account by the course instructors (Cercone 2008). Literature cites that online students underperform relative to the students attending the classes in face-to-face mode (Dendir, 2019). Stark (2019) states in his study that students attending the classes online reports lower levels of motivation, which leads to compromised academic performance for these students. Using survey data obtained from the Arizona State University, Aucejo et al. (2020) illustrates that there were negative effects of the COVID-19 on university students' outcomes and expectations, comprising delayed graduation and poor labour-market prospects. It was also illustrated that students from underprivileged backgrounds suffered from while taking the classes online. In Maldonado and De Witte (2020), it was reported that the primary school students in Belgium experienced losses in learning as illustrated by compromised performance in the standardized tests conducted after COVID-19 in comparison to the previous cohorts. Engzell et al. (2021) reported that students in Netherlands made little to no progress when learning at home during an eight-week lockdown, with the learning loss being most significant among students from impoverished families.

It is noteworthy that while there exists evidence supporting the traditional mode of learning over online mode, available literature highlights the otherwise too. For example, Chun & Heo (2018) pointed out that the flipped learning is effective method as it helps with improving the academic performance. In addition to this, Halabi, Essop, Carmichael, & Steyn (2014) illustrated that students who spent more time online significantly improved their overall grade. Students were reportedly satisfied with their academic performance as it was tied to their usage of the online materials. Wei & Chou (2020) reported that students' computer and internet fluency and motivation for learning had a direct influence in their online discussion score and course satisfaction. Similarly, Shaw, MacIsaac, & Singleton-Jackson (2019) indicated that students secured higher test scores using the online tool compared to multiple-choice paper-based exams marks; and Akhter, & Mahmood (2018) show that improving online technology fosters dynamic opportunities for students through remote learning.

b) Pakistan-Based Literature

In technologically and digitally advanced countries (Basilaia & Kvavadze, 2020), remote learning is useful, however it is noteworthy that for countries like Pakistan it is difficult to transition to the online learning mode given the resource constraints. It is important to mention that in Pakistan, substantial teaching and learning activities of educational organisations are carried out manually (Salam, Jianqiu, Pathan & Lei, 2017). The unavailability of fast, affordable, and smooth internet connections is something that serves to impede the development of online learning, particularly it's a challenge for the students who are taking the classes from the remote parts of the country. Furthermore, students attending the classes using mobile data are facing major constraints since the signal quality is relatively weaker which does not allow them to attend the classes smoothly. (Basilaia & Kvavadze, 2020). Nonetheless, this serves as a stark reminder of the lack of resources in academic institutions and the social marginalization of students, where limited access to the internet along with the lack of advanced technology affected organisational responsiveness and students' capacity in digital learning. Although it is known that ICT adoption in higher education settings is unavoidable, but due to limited budget, there are challenges being faced by the universities. It is important to highlight that only a few universities which are generally highly ranked can sustain the process of online learning while the others could barely manage to switch to this remote learning given the constraints. It is worth mentioning that some Pakistani academic research carried out previously have also documented promising findings of distance learning. For example, Ali and Ahmad (2011) concluded that just like traditional learning, there is satisfactory interaction in distance learning education among instructors and learners, the content is well-designed and both instructors and students are dedicated and trained with the required skills to transition smoothly to the remote learning mode. However, the contemporary situation of distance learning is revealing an entirely different picture of distance learning process -- something that is reflecting the limited resources and their unpreparedness for the distance learning programs.

To conclude, extant literature contains a comparison of student's attendance between face-to-face and online learning mode. The results are somewhat conflicting. While there are some authors that believed traditional learning cannot be replaced by online mode of learning because normal communicative processes are interrupted during online classes since there is lack of physical presence which makes cognitive, meta-cognitive and social learning more difficult. Supporters maintain that face-to-face groups' verbal and nonverbal communication and social exchange produce emotional connections and creates a sense of community. This is something which can barely be achieved while taking the classes remotely. Empirical research has shown that face-to-face interactions leads to the highest social interaction among the students in comparison to the online mode (Rice, 1993).

However, it has been argued by the opponents that the online media can serve to be more convenient and less nervous environment for learning communication (Zhan, Xu & Ye, 2011). Supporters for this argument drive inspiration from social presence theorists who maintain that through media all the social information pertaining to human connection can be transmitted (Short et al., 1976). It has also been put forward by social media theorists that it is not necessary to have physical co-presence for building psychosocial learning processes in online activities; what is actually important is communicative exchange among participants.

Given the differences of opinions and conflicting research outcomes in this context, it is imperative to understand this subject matter deeper and therefore, this study is aiming to fill on this gap. While recent studies have explored the challenges and opportunities pertaining to online learning, there remains a gap in literature regarding the students perceptions about this issue. It has been suggested by Mailizar et al., (2020) that how important it is to incorporate students' voices in this issue since they are major stakeholders in this context. Therefore, this study attempts to fill in this

gap by capturing the students' experiences by exploring their opinions and the challenge they are facing while taking the classes remotely. This has been done by conducting a qualitative research work.

Qualitative Evidence

a) Sample Composition

This research adopted a qualitative approach which draws on primary data collected by conducting Focus Group Discussions (FGDs) (Creswell & Plano Clark, 2007).

For that purpose, the study has integrated the qualitative data insights obtained from two focus group discussions (FGDs) respectively. These FGDs were conducted with the 11 participants who are enrolled in the universities located in Islamabad. There were two focus groups conducted, one of them comprised 5 participants and the other one involved 6 participants respectively, with the respondents aged between 18-25 years. The first group contained two males and three females and the second group included three males and three females, resulting in a relatively balanced gender composition overall. The sample majorly composed of master's students, with two bachelor's students in the second focus group. Participants of these FGDs were enrolled in the universities located in Islamabad, but they were taking the online classes from different regions of Pakistan, such as Balochistan, Punjab, and Islamabad. Participants represented diverse geographical backgrounds, with four distinct locations represented in each group. This variation provided a range of perspectives for examining participants' experiences and perceptions.

These discussions aimed to investigate the experiences of remote learning in more detail and reveal the challenges and constraints faced by the students that are compromising the quality of remote learning.

b) Thematic Analysis

For the purpose of analysis, a thematic analysis has been generated which is highlighted below.

Digital Infrastructure Constraints

This is the first major theme that emerged as a result of thematic analysis. It highlighted that unstable internet connection, power cuts, and inadequate telecommunications infrastructure as major hindrances to attending the classes smoothly from home. Students based in deprived areas were facing these challenges to a greater extent.

Students attending these classes from Balochistan especially mentioned how connectivity issues constantly served to be a hindrance in taking the classes remotely.



Without internet availability, how can we take the classes from our homes?

Another participant stated:



We struggle with both 4G and basic Wi-Fi signals.

Moreover, it was also highlighted that continuous electricity access along with the access to digital devices was crucial to be able to attend the classes from home.



Fast Internet access, power, and devices—all three are needed. If one is missing, the class is gone.

Additionally, power cuts appeared to be another prominent theme that hindered the ability of the students to take the classes online.



Because of the constant electricity load shedding issue, we were not able to attend the classes even if we wanted to.

On top that, students because of power outages, had to use mobile data – something that resulted in poor connectivity and further interrupted the remote learning process.



Since there was no electricity, we had to rely on mobile data, which was too weak to take the classes which is why we ended up not following the lectures throughout or missing them altogether.

The above accounts are reinforcing the literature findings about how the digital infrastructure limitations could lead to lower student's class participation and how this is experienced differently depending upon the region students are based in.

Learning Disengagement and Reduced Interaction

Respondents reported that the interaction between students and teachers was significantly dropped because of the online classes. This is something which further compromised the learning process and at times also led to delayed understanding of the concepts until it wasn't discussed with the peers or teachers.

One participant stated:

When we interact with our classmates, we discuss the concepts discussed in the classroom which leads to a better understanding of the concepts covered in the lecture. Because of online classes, this opportunity is not available which means our ability to comprehend the lecture content is also limited.

In the same fashion, another participant mentioned:

Since the discussion component is missing when we take the classes online, it seems to be more of a monologue.

It feels like we are merely listening, not actually participating.

There were some participants that drew a comparison between the distance learning and freely available educational content rendering the online classes a redundant exercise.

Why do we even have to take the classes online? Why are we not just consuming the relevant educational content available on YouTube, ChatGPT, and the likes of these? Because technically aren't these similar, if not same?

Moreover, it was frequently mentioned by the students that conducting the classes online seemed more of an administrative task which was mostly aimed at completing the course syllabus instead of a meaningful engagement.

Instructors are mostly focused on completing the course content without being considerate of the challenges students are dealing with while attending the classes from home.

Moreover, students also stated that they attended the classes just for the sake of attendance.

Taking the classes online seemed more of a formality because we were just taking it to meet our attendance requirements.

Furthermore, student's sense of responsibility was further compromised because of the uni-directional nature of the communication.

Student-teacher interaction during the online classes was one-sided.

There was no pressure of staying consistent because we were not attending the classes in-person

The above findings are demonstrating that lower student-teacher interaction and lesser levels of engagement in the online classes can lead to diminished student's motivation, participation, and overall engagement. These findings are consistent with the work done by Sahu (2020).

Conducive Family and Environmental Conditions

Qualitative analysis established that home environment and family environment appear to be play a major role in the academic performance as participants described home environment was a crucial factor in smoothly attending the classes remotely. They mentioned how household noises, shared study spaces, and family responsibilities acted as key barriers to concentration and meaningful academic engagement.

Students highlighted how the household conditions compromised their ability to take the classes from home which in turn reduced their efficiency.

While attending the classes from home, attention shifts too easily, and it becomes hard to concentrate.

There are too many distractions at the house which are interfering with my ability to take the classes from home

There was another concern highlighted during the FGDs which was the lack of independent and dedicated study spaces. Students had to take the classes from shared study spaces where the siblings were also simultaneously attending the classes, making it difficult for all of them to focus on the lectures.

We have quite limited study space. Online classes require isolation, but we don't have that liberty because other siblings are also taking classes remotely.

Other than physical constraints, participants also highlighted how sense of discipline and responsibility declined during remote learning:



Taking the classes from home affected our discipline and compromised our sense of responsibility.

Additionally, gendered variations also emerged in this context. For instance, female respondents cited how frequently their ability to focus and take classes was disrupted because of the added household responsibilities:



When we are taking the classes online, there is an expectation on us to contribute to the household chores as well.

All in all, home environment appeared to be a significant predictor of academic performance that influences student's ability to concentrate, maintain discipline, and engage meaningfully while taking the classes online. Overall, this is supportive of the work done by Hulett (2018).

Social and Psychological Wellbeing

In addition to the academic outcomes, another theme that emerged was social and psychological impacts of the online learning. Because of online classes, students stayed away from campus which led to the feelings of isolation, reduced motivation, disruptions in daily routine activities along with other issues. Moreover, there was a lack of organization and structure arising from students not being involved in basic campus-related activities for example getting ready, commuting, or peer-to-peer interaction. This was perceived as stressful and demotivating in general.

Another concern highlighted was elongated hours spent on screen using social media and scrolling unnecessarily. This is something that affects the overall being by causing eyestrain and having other negative physical and mental health effects. Furthermore, not being able to see the friends was also associated with feelings of stress and loneliness.

A participant stated:



When I'm taking the classes remotely, I just end up scrolling Instagram instead of paying attention.

It is also important to mention how clearly the regional disparities emerged in the context of overall wellbeing experiences. Students residing in Islamabad majorly associated stress with behavioural and psychological causes including digital distractions and "doomscrolling", whereas respondents based in other regions of the country reported challenges like unstable internet connectivity, power shortfalls, and non-conducive home environments that would explicitly disrupt the process of learning and in turn would impact the overall stress levels.

All in all, the above findings are indicating that subjective wellbeing is shaped by several factors such as behaviours, isolation, and innate structural inequalities. The nature of the stressors is dependent upon the region, home environment and the personality traits of the individual themselves.

Discussion of Findings

Both empirical literature and qualitative findings unanimously reveal that home environment and conducive family conditions are prominent predictors of students' performance. Participants cited household noise, restricted study spaces, and competing household responsibilities as key barriers on concentration and academic discipline. These findings are coherent with the work of Jimoyiannis and Gravani (2011).

In the same fashion, another convergence emerged in the context of digital infrastructure i.e., both the extant literature and qualitative findings demonstrate a significant relationship between internet access, power cuts and academic performance. Qualitative insights highlight how these challenges are particularly prominent in the case of underserved areas like Balochistan – something that is indicative of the regional disparities in this context.

The qualitative insights further shed light on the social and psychological dimensions of this association. Students reported experiences of isolation, reduced motivation, disrupted daily routines, and increased reliance on social media, including compulsive scrolling during classes. It is important to highlight how regional variation was evident in these experiences: students from Islamabad primarily attributed stress to behavioural factors such as digital distraction, while students from other regions emphasised structural constraints including poor connectivity, electricity shortages, and unconducive home environments. This is something which reflects differentiated pathways through which stress is produced across contexts.

To conclude, insights from empirical and qualitative analysis confirm how academic performance in online learning is primarily shaped by home environment and family conditions, reinforced by digital infrastructure, while also underscoring significant regional inequalities in both access and experience. The evidence collectively indicates that online learning outcomes are grounded within broader socio-economic and infrastructural contexts that influence both performance and overall wellbeing of the students. This finding is consistent with the work produced by Urtel (2008).

Table 1. Synthesis of Qualitative Findings, Empirical Evidence and Theoretical Perspectives

Theme	Findings from the Present Study	Evidence from Previous Research	Theoretical Explanation	Relationship with Existing Evidence
Digital infrastructure constraints	Students reported unreliable internet, electricity outages, reliance on mobile data, and regional disparities in connectivity.	Pakistani studies similarly identify poor internet connectivity, mobile-data limitations, inadequate technological resources, and greater barriers in remote areas (Shehzadi et al., 2021; Abbas et al., 2017; Ali, 2020).	Connectivism highlights the importance of access to digital networks and technologies for learning. Cognitivism suggests that repeated technological disruptions may interfere with concentration and information processing.	Strongly corroborates existing evidence, particularly regarding infrastructure and regional disparities.

Learning engagement and interaction	Students described limited interaction, passive participation, attendance-oriented classes, and reduced motivation.	Studies report lower motivation and performance among some online learners (Stark, 2019; Bir, 2019; Dendir, 2019). Conversely, other studies report positive outcomes where online learning is supported by motivation, digital skills, and effective course design (Chun & Heo, 2018; Wei & Chou, 2020; Shaw et al., 2019).	Constructivism emphasises interaction and collaboration in knowledge construction, while Behaviourism helps explain structured and assessment-oriented forms of instruction.	Generally supports the critical strand of the literature, while reflecting the wider mixed evidence on online learning effectiveness.
Household and environmental constraints	Students highlighted household distractions, limited study space, interruptions, and competing family responsibilities.	The reviewed literature provides comparatively limited direct empirical evidence on household-level constraints, although environmental and learning conditions are recognised as relevant to online learning experiences.	Cognitivism provides a useful explanation, as distractions and competing demands may increase cognitive load and reduce students' ability to concentrate and process information effectively.	Extends the existing literature by bringing greater attention to students' immediate household and learning environments.
Social and psychological wellbeing	Students reported isolation, disrupted routines, social media	Previous research identifies weaker social interaction and reduced motivation in some online settings	Constructivism emphasises the role of social interaction in learning, while Connectivism	Partially corroborates existing concerns, while highlighting

Source Author (2026)

Conclusion and Policy Implications

This study reveals that students' academic experiences while taking classes from home are predominantly determined by home environment and family conditions, reinforced by access to concrete digital infrastructure. The findings indicate both structural constraints and lived experiences of learners. Overall, while online learning enables educational continuity during disruptions, its effectiveness remains constrained by unequal family conditions and digital inequalities, creating serious implications for fairness in higher education.

Universities should implement simple grievance and technical support services, such as WhatsApp helplines or online reporting forms, enabling students to swiftly report concerns relating to connectivity, power outages, or device access during remote learning. IT support staff should reply within 24 hours by providing solutions such as recorded lectures, hotspot help, or offline learning resources.

Second, institutions should consider adopting a hybrid model (e.g., two days on-campus and three days online), rather than completely shifting to online learning mode during unusual circumstances. This would help in maintaining the structured classroom interaction.

Third, existing computer labs and libraries should be repurposed to facilitate remote learning as they are equipped with backup electricity and stable internet access. Since there is presence of university campuses across districts, students should also be permitted to access the nearest available campus for taking the classes remotely. This would reduce the commuting while also allowing the students to escape their noisy households.

Finally, it is very important to modernise the educational system to better facilitate the intricacies of digital and blended learning. Extant structures remain largely grounded in the conventional face to face teaching models, and there is a need to restructure curricula, teaching methods, and assessment systems to align with the requirements of online and hybrid education.

Bibliography

- Akhter, H., & Mahmood, M. (2018). Study of the impact of online education on students' learning at university level in Pakistan. *International Journal of Distance Education and E-Learning*, 3(2).
- Ali, A., & Ahmad, I. (2011). Key factors for determining student satisfaction in distance learning courses: A study of Allama Iqbal Open University. *Contemporary Educational Technology*, 2(2), 118–134.
- Anastasiades, P. S., Filippousis, G., Karvunis, L., Siakas, S., Tomazinakis, A., Giza, P., & Mastoraki, H. (2010). Interactive videoconferencing for collaborative learning at a distance in the school of 21st century: A case study in elementary schools in Greece. *Computers & Education*, 54(2), 321–339.
- Aucejo, E. M., French, J., Ugalde Araya, M. P., & Zafar, B. (2020). The impact of COVID-19 on student experiences and expectations: Evidence from a survey. *Journal of Public Economics*, 191, 104271.
- Bakia, M., Shear, L., Toyama, Y., & Lasseeter, A. (2012). Understanding the implications of online learning for educational productivity. U.S. Department of Education, Office of Educational Technology.
- Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagogical Research*, 5(4), Article em0060.
- Berenson, R., Boyles, G., & Weaver, A. (2008). Emotional intelligence as a predictor of success in online learning. *The International Review of Research in Open and Distributed Learning*, 9(2).
- Cercone, K. (2008). Characteristics of adult learners with implications for online learning design. *AACE Journal*, 16(2), 137–159.
- Chun, B. A., & Heo, H. J. (2018). The effect of flipped learning on academic performance as an innovative method for overcoming Ebbinghaus' forgetting curve. In *Proceedings of the 6th International Conference on Information and Education Technology* (pp. 56–60).
- Cooper, P. A. (1993). Paradigm shifts in designed instruction: From behaviorism to cognitivism to constructivism. *Educational Technology*, 33(5), 12–19.
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, 11(6), 671–684.
- Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, 104(3), 268–294.
- Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Sage.
- Dabbagh, N. (2007). The online learner: Characteristics and pedagogical implications. *Contemporary Issues in Technology and Teacher Education*, 7(3), 217–226.
- Dendir, S. (2019). Performance differences between face-to-face and online students in economics. *Journal of Education for Business*, 94(3), 175–184.

Downes, S. (2006). Learning networks and connective knowledge. *Instructional Technology Forum*, 92.

Engzell, P., Frey, A., & Verhagen, M. D. (2021). Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences*, 118(17), e2022376118.

Halabi, A. K., Essop, A., Carmichael, T., & Steyn, B. (2014). Preliminary evidence of a relationship between the use of online learning and academic performance in a South African first-year university accounting course. *Africa Education Review*, 11(3), 405–423.

Hulett, M. T. (2018). Online teaching strategies & best practices [Doctoral dissertation, California State University, Los Angeles].

Hussain, I., Hussain, I., & Ramzan, M. (2019). Future prospects of virtual education in Pakistan: Opportunities and challenges. *Journal of Research in Social Sciences*, 7(1), 149–163.

Jimoyiannis, A., & Gravani, M. (2011). Exploring adult digital literacy using learners' and educators' perceptions and experiences: The case of the second chance schools in Greece. *Educational Technology & Society*, 14(1), 217–227.

Jowsey, T., Foster, G., Cooper-loelu, P., & Jacobs, S. (2020). Blended learning via distance in pre-registration nursing education: A scoping review. *Nurse Education in Practice*, 44, 102775.

Mailizar, Almanthari, A., Maulina, S., & Bruce, S. (2020). Secondary school mathematics teachers' views on e-learning implementation barriers during the COVID-19 pandemic: The case of Indonesia. *EURASIA Journal of Mathematics, Science and Technology Education*, 16(7), Article em1860.

Maldonado, J. E., & De Witte, K. (2022). The effect of school closures on standardised student test outcomes. *British Educational Research Journal*, 48(1), 49–94.

Noor, S., Ali, M. N., & Husnine, S. M. (2020). Performance of online classes in Lahore, Pakistan during Covid-19. *Performance Improvement*, 59(9), 33–42.

Pavlov, I. P. (1927). *Conditioned reflexes: An investigation of the physiological activity of the cerebral cortex* (G. V. Anrep, Trans.). Oxford University Press.

Rice, J. K. (2012). Review of "The costs of online learning". National Education Policy Center.

Rice, R. E. (1993). Media appropriateness: Using social presence theory to compare traditional and new organizational media. *Human Communication Research*, 19(4), 451–484.

Sahu, P. (2020). Closure of universities due to Coronavirus Disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus*, 12, e7541.

Salam, S., Jianqiu, Z., Pathan, Z. H., & Lei, W. (2017). Strategic barriers in the effective integration of ICT in the public schools of Pakistan. In *Proceedings of the 2017 International Conference on Computer Science and Artificial Intelligence* (pp. 169–172).

Shaw, L., MacIsaac, J., & Singleton-Jackson, J. A. (2019). The efficacy of an online cognitive assessment tool for enhancing and improving student academic outcomes. *Online Learning*, 23(2).

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. John Wiley & Sons.

Siemens, G. (2004). *Connectivism: A learning theory for the digital age*. eLearnSpace.

Skinner, B. F. (1974). *About behaviorism*. Knopf.

Stark, E. (2019). Examining the role of motivation and learning strategies in student success in online versus face-to-face courses. *Online Learning*, 23(3), 234–251.

Thorndike, E. L. (1913). *Educational psychology: Vol. 2. The psychology of learning*. Teachers College, Columbia University.

Urtel, M. G. (2008). Assessing academic performance between traditional and distance education course formats. *Journal of Educational Technology & Society*, 11(1), 322–330.

Wei, H.-C., & Chou, C. (2020). Online learning performance and satisfaction: Do perceptions and readiness matter? *Distance Education*, 41(1), 48–69.

Wilson, B. G. (Ed.). (1996). *Constructivist learning environments: Case studies in instructional design*. Educational Technology Publications.

Zhan, Z., Xu, F., & Ye, H. (2011). Effects of an online learning community on active and reflective learners' learning performance and attitudes in a face-to-face undergraduate course. *Computers & Education*, 56(4), 961–968.