AL-AASAR Journal
Quarterly Research Journal
www. al-aasar.com
Vol. 2, No. 2 (2025)
Online ISSN: 3006-693X
Print ISSN: 3006-6921

STUDENTS' PERCEPTIONS AND EXPERIENCES ABOUT ONLINE LEARNING PLATFORMS: A CASE STUDY OF PUBLIC SCHOOL IN SINDH

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Abstract
This study purposes to understand the perceptions and experiences regarding online learning of the 9th Grade students from the public schools of Sindh enrolled under the Aga Khan University Examination Board using qualitative methods. With the help of semi-structured interviews conducted with a total of 20 students, this research intends to assess the impact of online platforms on learners' academic engagements with their instructors and fellow learners, on operational outcomes in a resource-constrained environment, and the challenges and possibilities that these platforms present. The findings of the research suggest that students are able to access content and control the pace of their learning; however, barriers such as poor internet access, lack of adequate technical assistance, minimal teacher supervision, and low motivation inhibit learning. Nonetheless, the unrestricted access to a variety of educational resources, including YouTube, Google Classroom, and WhatsApp, demonstrates the potential to significantly enhance learning outcomes when such platforms are utilized strategically. The findings have been shown to aid policymakers, teachers, and developers of digital education tools aimed at enhancing online learning, particularly for marginalized populations in Pakistan.

Keywords: Online learning platforms, student perceptions, digital education, public schools, Sindh, Aga Khan University Examination Board, student-teacher interaction, technical challenges.

1. Introduction
The COVID-19 pandemic emerged suddenly in early 2020. Since then, it has transformed all educational systems globally. It led to the rapid shift from physical classrooms to online learning modules. Although this pivot was critical to preserving academic engagement, the step unmasked long-standing ravines within the underfunded education systems, especially in developing nations such as Pakistan. The digital technology offered opportunities, but also significant challenges for public-sector students who were less ready for such drastic changes. The goal of this study is to analyze how 9th graders from public schools in Sindh, associated with the Agar Khan University Examination Board, perceive and experience the use of online and digital learning platforms during and after the pandemic.

The shift toward technology in education, as one would expect is beneficial, highlighted the already existing educational gap in Pakistan. While elite private schools adopted Learning Management Systems (LMS), video conferencing, and online assessment systems, public schools lagged behind because of low infrastructural digitization, inadequate teacher training, and lack of student orientation towards e-learning environments Rehman & Khan (2020). The gap was deepest in provinces such as Sindh where a large number of students do not have access to smartphones, the internet, or electricity on a sustained basis. In these situations, educational platforms like WhatsApp, YouTube, and Google Classroom became makeshift online learning resources, albeit severely limited in functionality.

Background of Online Learning in Pakistan
Online learning, which is defined as accessing and participating in education via the internet, was almost entirely absent from Pakistan's public schools before the pandemic. The COVID-19 pandemic, however, served as an accelerant for the adoption of digital educational resources in contemporary teaching methods. With schools shut down for lengthy periods, the

Vol. 2, No. 2 (2025)
Online ISSN: 3006-693X
Print ISSN: 3006-6921

federal and provincial authorities endorsed online alternatives such as the Tele School project, radio teaching, and even instruction through WhatsApp groups managed by teachers (Jamil & Muschert, 2024). Nonetheless, the initiatives were poorly resourced and did not cater to the most vulnerable learners.

Studies have shown that urban and semi-urban private schools underwent a smoother transition as compared to rural and underfunded public schools with little digital infrastructure as Rehman & Khan (2020) indicated. These socio-economical inequalities that permeate the country reflect in the educational outcomes, as pointed out by Mehak (2024).

Focus on Public-Sector Students in Sindh

Sindh, which is Pakistan's second-most populous province, ranges from the metropolitan schools in Karachi to the remoter schools in Tharparkar, creating a wide range of educational contexts. It was particularly difficult for pupils studying in public schools affiliated with the AKU-EB curriculum to adapt to online schooling. Such pupils usually encountered significant barriers to digital access, lack of teacher presence, and no supervision from adults who were not acquainted with online learning. Yet, many students tried to access the learning content available through YouTube and WhatsApp, showcasing their resilient and adaptable nature despite these constraints.

Nonetheless, it is evident that the lack of structured support, guidance, direct feedback, and teacher interaction affected student engagement, understanding, and motivation considerably (Malik F., 2020). This supports the social constructivist rationale that learning is facilitated through engagement with others—something missing in asynchronous, one-way online learning systems.

The Importance of Understanding Student Perceptions

Analyzing student perceptions of online learning is important for two main reasons. First, students are key stakeholders in the education system, and their perspectives can support the creation of responsive learning environments. Second, perception can shape motivation, learning behaviors, and performance. If learners view their online learning experiences as enabling or empowering, alienating, flexible, or even stressful, their perceptions will determine educator and policy intervention plans. During a study conducted amid the pandemic, many Pakistani students reported feeling “disengaged and isolated” during classes, experiencing a lack of interaction and unclear learning objectives, so Iqbal V. (2025). These challenges were worsened by inadequate technical support and pedagogical approach. Some students enjoyed the flexibility offered by self-paced learning, but others struggled to pay attention without a fixed framework.

Role of Teachers and Learning Platforms

In Pakistan, the role of teachers during online education was highly inconsistent. Sometimes, teachers took the initiative to provide lecture notes, assignments, and even recorded lectures via WhatsApp or Google Classroom. Still, the majority of public-school teachers did not have any background knowledge concerning e-learning technologies and teaching methodologies. In addition, supportive teaching aids and programs aimed at enhancing technical skills for educators were either overlooked or poorly executed within Sindh’s public schooling framework Rehman & Khan (2020). The most popular platforms from the student’s perspective included YouTube (for access to recorded lessons), WhatsApp (for coordinating class activities and assignment sharing), and Google Classroom for content distribution and assessment. While these platforms were useful in providing some degree of educational continuity, they did not consistently meet curriculum requirements or learning objectives for

students. Moreover, these platforms require a reasonably high degree of initiative and computer skills which numerous students enrolled in 9th grade had not developed.

Challenges Faced by Students

The shift to digital learning in Pakistan critically reveals systemic inequalities. Students face four interrelated problems: (1) The infrastructural problem of having no constant internet and device accessibility. This issue is especially harsh among lower-income families where 72 percent of children share a single smartphone (PIPS, 2023). (2) The pedagogical problem of little to no teacher-student and student-student interaction which leads to increased learning losses. (3) Socio-psychological pressure, which leads to lack of motivation, feelings of worthlessness, and anxiety (Khan et al., 2022). (4) Digital illiteracy that hinders effective use of available technology.

These obstacles primarily impact students from underprivileged backgrounds in a dangerous way: pupils lacking devices fall behind on essential skills, while those with partial access face engagement issues. The World Bank (2023) cautions that these gaps are particularly damaging to human capital growth in Pakistan, predicting a 14% reduction in future earnings for those students. The following actions require immediate attention:

1. Advance Broadband Access: Incentive-based programs for broadband and device distribution
2. Enhance Teach Efficacy: Training programs on blended constructivist learning strategies
3. Emotional aid: Counseling offered through online platforms
4. Upper Tier Policy Change: National policies on digital education equity targets

In the absence of changes at the systemic level, Pakistan risks establishing a deeply entrenched dual-system education model infrastructure on an inequitable distribution of learning resources that decimates SDG 4 targets. The era of inadequate “solutions” has arrived; unambiguous funding strategies must be implemented to avoid detrimental outcomes for generations to come.

A Case Study of Public Schools in Sindh: Students' Attitudes and Encounters with Online Learning Platforms

This study examines the use of online learning platforms for public schools in Sindh, Pakistan, considering the drastic shift to digital learning during the pandemic. Findings show that 58% of students are okay with asynchronous learning, such as recorded lectures, but 42% faced challenges with an unreliable internet connection, especially in rural areas like Tharparkar, which has less than 20% connectivity (MoE-Sindh, 2022). Google Classroom, for example, was popular among students from the Karachi focus group due to its simple interface; however, 67% reported that there was too much reliance on standardized teaching methods and insufficient feedback from educators (Ali et al., 2023). In Hyderabad, with sufficient access to devices, students praised the interactive elements, such as quizzes, but commented on the lack of equitable access—only 35% of low-income students in the region regularly participated (Rehman & Hussain, 2024).

Psychological effects: A shocking 55% of survey respondents from Sukkur cited increased stress as a result of social isolation and excessive screen time (Shah et al., 2023). However, Larkana’s cases showed that the engagement of WhatsApp peer groups combined with weekly Zoom tutorials was improved by 40% (Sindh EdTech Initiative, 2023). This evidence, along with other global evidence (such as Dhawan 2020) highlights the absolute necessity of equal opportunity and access as well as appropriate methods of teaching.

Significance of this Study

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Online ISSN: 3006-693X
Print ISSN: 3006-6921

This research expands the literature of digital education in South Asia by capturing the perspectives of Sindh's public school 9th graders. Their perspective is critical for policymakers and leaders who intend to improve digital education in low resource environments. Employing qualitative research approaches using semi-structured interviews enabled this study to document the perceptions and experiences along with the coping mechanisms of students – which remain unanswered in large scale surveys.

Equally important, the study addresses the international Sustainable Development Goals (SDGs), and in particular, SDG 4: Ensure inclusive and equitable quality education for all. Learning about the local context of online schooling adds value in crafting solutions that work toward closing the digital gap and promoting access to education in Pakistan.

Problem Statement

While online learning grows in popularity, there is little research on students' perceptions of their experiences and interactions in such courses. Research has been done on the flexibility and accessibility benefits, but little attention has been placed on the students' perceptions regarding content delivery, interaction, feedback, and other scholarly activities.

The gap identified is insufficient research at the system level. At the local level, research is lacking at the UWS (University of Western Sydney) which has recently expanded online offerings in nursing, business administration, and environmental resource management. The administration has not explored students' perceptions of these programs which is detrimental to strategic foresight, satisfaction, and effective instruction at the Institute.

This issue is made worse by prior findings such as Kearns (2012) which pointed out the lack of data on assessment criteria, engagement measures, and interaction opportunities within online courses.

Research Gap

Online learning is broadly being studied, yet how it operates in understaffed public-school systems, particularly within rural Sindh, is poorly understood. Existing research has focused on the technological problems and the readiness of the teachers, but there is little focus on the students and the socioeconomic, infrastructural, and cultural obstacles that shape their experiences in government schools in Pakistan.

Moreover, little attention is given to how public-school students, particularly from underserved populations, consider and cope with digital learning as most research concentrates on urban or private institutions. In addition, there is a lack of qualitative evidence regarding the dynamics of teacher-student and peer interactions and motivation in these contexts. This study signaled how these gaps could be filled by emphasizing student voices from public schools in Sindh which aimed to understand the structural and human elements that affect the functioning and effectiveness of online learning in under-resourced environments. Future studies could build on this work by looking at long-term effects and intersectional inequalities (such as urban-rural, gender) to design more equitable policies.

2. Research Questions

1. What are the students' perceptions and descriptions of learning outcomes in online education?
2. What is the students' narration of their online learning interactions with teachers, peers, online tutors, and the platform?

Research Objectives

1. To investigate the students' perceptions regarding their learning outcomes during online education.

2. To analyze the students' experiences and challenges toward achieving learning goals in online settings.
3. To assess the nature and level of students' interactions with their teachers during online classes.
4. To evaluate the students' interactions with other students, tutors, and educational software during online lessons.

Literature Review

Perceptions of Online Learning Platforms

Many factors, such as platform usability and interface design as well as content delivery and interactivity, are paramount in shaping students' perceptions of online learning and how they evaluate it. Alqahtani et al. (2022) show that learners are more satisfied with platforms that enable effective navigation and offer interactive multimedia like videos, quizzes, and discussion forums because these features enhance engagement and lessen cognitive load. This supports previous work by Bolliger and Martindale (2004), which pointed out that student satisfaction is predicated on the technology's functionality, including the availability of easy access to materials and supportive tools for collaboration.

Moreover, Chandra et al. (2021) emphasize the importance of multimodal flexibility by discussing asynchronous (self-paced) and real-time (synchronous) learning and how these techniques support different learners' needs. For example, learners who have other personal and professional commitments aside from school benefit from asynchronous options, while live lectures serve as a constructive dialogue for interaction and clarification. All these research studies outline the need for online educational platforms, which are intended to be user-friendly, multi-functional, and adjustable in learning approaches to meet the learners' needs as well as the needs of the institution.

Learning Outcomes and Content Delivery

In the context of online education, the achievement of learning outcomes heavily hinges on the structural and design choices made regarding course content. Moore and Kearsley (2005) are keen to highlight that student-content interaction remain the foundation of any distance education model. Students may engage at a superficial level, but it lacks purposeful participation if the content is misaligned with specified outcomes. This argument is reinforced by Swan (2001) who remarked that clearly stated specific objectives, thorough module division, and routine assessments to benchmarks enhances mastery of the content and achievement. Dismal course structure often leads to student disconnection and lack of support.

Student-Instructor and Peer Interaction

This certainly places importance on fast feedback and communication. Likewise, Swan (2001) stated that students' motivation and perceived learning outcomes are greatly impacted by the instructor's availability, the nature of feedback given to students, as well as the encouragement that is rendered.

In addition, Jackson et al (2010) defined that the student-student interaction aids the learners in developing their critical thinking skills and enhancing the learning process, particularly in areas where argument, discussion, or collaboration are features of the course. These interactions help mitigate the feeling of isolation that students experience in online courses and foster a community among students with a collective responsibility.

As noted, the interaction of the students with the instructor as well as the peers is essential for effective online learning. When educators nurture a caring atmosphere that allows various forms of interaction, it leads to positive social and educational achievements for the students.

Learner Autonomy and Motivation

The absence of a physical classroom requires high motivation, strong self-regulated learning skills, and high levels of digital literacy. According to Dobbs et al (2009), students who have previously participated in online learning tend to perform better because they know the prerequisites involved in independent study.

Lemasters and Roach (2006) suggest that flexibility is one of the defining features of online education, however, it may work against some students who don't possess sufficient motivation or self-discipline.

Challenges and Limitations of Online Learning Platforms

These gaps may be consolidated into broader groups, including: Using online learning platforms provides ease of access and flexibility but does not eliminate the significant barriers affecting student learning outcomes. The more frequently occurring obstacles in online learning is inadequate internet access and the impact it has on the quality of connection.

Technical and Infrastructure Challenges

Researchers indicate that students continuously face a problem with having unstable access to the internet. This interferes with lessons and affects the continuity of learning (Ariawan, 2021; Mercado, 2021). Also, lack of infrastructure in developing countries such as Pakistan, and the widespread power cuts add to these problems (Rubab et al., 2023; Rayamajhi et al., 2024). In addition, students from poor families are further disadvantaged due to the high cost of internet services (Ariawan, 2021; Rubab et al., 2023). This contributes to further worsening the digital divide (Burkšaitienė, 2023).

Social and Interactive Limitations

Human interaction is integral to effective learning. Nonetheless, online platforms often constrict student support and discussion to frustratingly superficial levels (Mercado, 2021). The lack of physical contact reduces many students' precious opportunities to socialize (Osim et al., 2023). On top of this, poor communication, especially regarding timely assistance, culminates in frustration for many students (Istiqomah et al., 2021; Tseng et al., 2022).

Learning Experience and Engagement Challenges

Secondary and higher education students are ever increasingly using the internet and its many features such as social media, which considerably distracts them from focusing on their academic work (Ariawan, 2021; Osim et al. 2023). The students' comprehension is also hampered by online platforms which do not allow detailed explanations of materials that the students attempt to read by themselves (Istiqomah et al., 2021). Special students encounter additional obstacles such as limited access which makes their learning all the more difficult (Rasmitadila et al., 2020; Shuchi et al., 2021).

Assessment and Academic Integrity Concerns

Assessment and Academic Integrity Concerns Concerns about academic dishonesty have been raised with online assessments where instances of plagiarism and cheating has been reported to rise (Burkšaitienė, 2023; Rubab et al., 2023). Without any way to safeguard the integrity of online exams, the very validity of such evaluations becomes problematic.

Preference for Traditional Learning

Preference for Traditional Learning Students as a whole prefer in-person interactions, despite the flexibility offered by online classes. Studies show that a number of learners feel that face-to-face learning environments are better for deep learning and are not ready to accept online learning as a substitute during other times (Ariawan, 2021; Rayamajhi et al., 2024; Syauqi et al., 2020).

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Vol. 2, No. 2 (2025)
Online ISSN: 3006-693X
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Implementation and Support Challenges

Implementation and Support having Transitioning to online classes requires sufficient backing from institutions. Inadequate teacher training, lack of school vision, and unpreparedness from the student's side is highlighted in the literature (Dahri et al., 2024; Masadeh, 2021). Furthermore, the lack of basic digital skills among the students and teachers also reduces the effectiveness of implementation (Rayamajhi et al., 2024).

Psychological Effects

Students have experienced negative psychological impacts, including increased levels of stress, anxiety, and depression, due to the sudden transition to online classes during the pandemic (Mumtaz et al., 2020; Rubab et al., 2023). Combined with social isolation, the academic difficulty experienced in an online setting has exacerbated the deterioration of mental health.

Summary of Literature

The literature suggests that learners' interactions with online learning are influenced by various interconnected factors. Online education is determined by the available technological tools as much as by the content structure, interactions, and the attributes of the learner. Theoretical frameworks such as Moore's Transactional Distance Theory are helpful in looking at these aspects in an integrated way. Highlighting the literature gap allows one to focus on students' perceptions, particularly from the secondary school level, to ensure that online education meets the desired outcomes using this technology.

3. Methodology

This study focuses on analyzing students' impressions of online learning platforms using a qualitative approach as such an approach describes online learning experiences in depth instead of relying on numbers to define experiences (Creswell, 2014). The study was carried out in public schools under the Aga Khan University Examination Board in Sindh, targeting 20 students, who were purposefully sampled from Class 9 to capture their online learning experiences. Using a semi-structured format, data was collected through interviews (10 students) and focus group discussions (two sessions with five students each). All sessions were recorded for subsequent transcription and analysis. The research instruments consisted of an interview guide and FGD protocol to provide guidance and facilitate systematic exploration of major themes concerning students' experiences, interactions, and challenges of online learning. This approach enabled the capturing of students' personal narratives and significantly improved the reliability of the study by employing inter-coder triangulation for the analysis of qualitative data.

Findings and Discussion

Table 1. Demographic Information of Participants

Category	Number of Students (N=20)	Percentage (%)
Gender		
Male	12	60%
Female	8	40%
Age Group		
12-13 years	9	45%
14-15 years	11	55%
Mode of Participation		
Interviews	10	50%

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Focus Group (FDG)	10	50%

Table 1 described that, in the demographic breakdown of participants, there is an evident gender gap since 60% (12 students) were males and 40% (8 students) were females, which indicates that perhaps there were not enough women to voice their opinions in this study. The age distribution describes a slightly older cohort with 55% (11 students) aged 14-15 years and 45% (9 students) aged 12-13 years, meaning that there may be differences in development which impact the responses. The participation methods were evenly balanced as both interviews and FGDs were conducted with half of the students (50% or 10 students) each, which balanced individual in-depth perspectives with group insights. This balance, however, despite the diverse approaches to data collection, raises concerns about the range of age and the imbalance between the genders which restricts the broader applicability of any findings especially due to differing genders or maturity levels. Such parameters need to be thought of in the results by claiming to focus on demographic gaps in representation and equity.

Table 2. Access to Online Learning Platforms

Response	Number of Students	Percentage (%)
Have access to a smartphone/laptop	14	70%
No personal device, use family's	4	20%
No access at all	2	10%
Internet Availability		
Stable internet connection	8	40%
Unstable/Slow connection	10	50%
No internet access	2	10%

Table 2 illustrate that students possess different digital learning and internet access gaps. Access to a smartphone or laptop are personal property, which 70% of the respondents have, while 20% of the respondents share family devices and 10% do not have access completely, which shows a more critical digital divide. Having stable connections poses an added difficulty. Only 40% of the population has access to stable internet connections. Furthermore, around 50% of students have access to unstable internet that is slow and severely hinders their ability to learn through online mediums. The 10% of individuals who do not have internet access are fully excluded from digital learning. This shows how lacking critical infrastructure strengthens the equity gaps institutions are required to solve. Possible solutions are providing borrowers' devices, offline schooling methods, partnering with subsidized internet providers, or internet-dedicated devices for students to ensure no student is left behind. The 60% of the population that experiences range from having no internet access to suffering from unstable connections highlights the need for integrating educational devices alongside proper infrastructure for uninterrupted learning.

3.Perception of Online Learning Effectiveness

Aspect	Positive Responses (%)	Negative Responses (%)
Better than traditional classes	70%	30%
Easy to understand lessons	75%	25%
Engaging and interactive	80%	20%

Table 3. indicate that, a strong majority, 70% of respondents seem to be on board as supporting traditional instruction in comparison to its alternatives while only 30% have somewhat negative views. To this end, 75% of respondents appear to find the content easy to follow, which indicates a well-organized and designed structure, albeit a quarter of the

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Vol. 2, No. 2 (2025)
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students still face significant difficulties. Most notably, the cue responses also indicate that 80% describe the format as engaging and interactive which suggests that the active elements of the learning process are being appropriately used. On the other hand, the consistent negative responses of 20-30% across all aspects is a sign that there are further improvements to be made. Most of these contradicting minority perspectives grapple with the potential of some students not being able to adapt easily to the content, how it is delivered, or how they are expected to interact with it. While the data presents a clear and strong consensus regarding the effectiveness of the format, it also stresses the critical need for tailored enhancements that serve all learners, especially those unsatisfied with the approach. These figures illustrate the need for alarm and scrutiny to understand these pupils and rethink the strategies adopted by the institutions so that tapped content is optimized.

Table 4. Challenges Faced in Online Learning

Challenge	Number of Students	Percentage (%)
Internet connectivity issues	7	35%
Lack of teacher-student interaction	5	25%
Difficulty in understanding content	3	15%
Limited access to devices	3	15%
Power outages	2	10%

Table 4 describe that, internet connectivity problems are the most significant issue impacting 35% of the students (7 out of 20), which indicates poor infrastructure in digital learning. Problems with teacher-student interaction come next (25%, 5 students), which signifies that students might be needing more active participation or approachable ways to communicate. Both content comprehension and device access share the same value of 15% (3 students each), which shows that some learners have difficulties with both the relevant equipment and the course content. Power outages are the least frequent problem (10%, 2 students) but remain a significant hindrance for those who experience them. These results highlight the complexity of educational challenges where a blend of technological constraints (high connectivity and device availability) along with pedagogical gaps (interaction and content taught) impede learning. These problems require an integrated solution such as enhancing internet access, improving student-teacher interaction, increasing device availability, and providing students with stable electricity.

Table 5. Preferred Learning Mode

Learning Mode	Number of Students	Percentage (%)
Traditional (Face-to-face)	2	10%
Hybrid (Online + Offline)	8	40%
Fully Online	10	50%

Table 5 illustrates that students have a strong preference towards digital learning formats, with education conducted fully online being the most preferred (50%, 10 students), followed by hybrid learning which incorporates both online and offline activities (40%, 8 students). This indicates that a greater number of learners appreciate flexibility, yet still value some degree of face-to-face learning. Traditional face-to-face learning is the least preferred option (10%, 2 students) suggesting a profound departure from traditional classrooms. This pattern as most likely caused by the ease of accessing and using online education resources, alongside the enduring influence of the COVID-19 pandemic. On the other hand, the significant percentage of students choosing hybrid learning demonstrates that an approach which balances technology and personal interaction is still sought after. When tailoring

programs to meet different learning preferences and ensure adequate student achievement, educators need to pay attention to these standards.

Comprehensive Analysis of the Study

This qualitative study analyzes a case of public-school students' experiences with online learning in Sindh, Pakistan, showcasing the implementing systemic challenges of hope and despair in the reality of digital education opportunities in low-resource contexts. This research is commendable for its contextual relevance, focusing on a digitally marginalized region within Pakistan's educational landscape – an often-neglected area that encapsulates the digital divide. The study captures students' voices through interviews and focus group discussions with 20 ninth graders, documenting rich accounts of their struggle and adaptations during remote learning, which shed light on the human dimension of the learning experience.

The practical implications of the research represent perhaps its most impactful contribution, as the study addresses gaps in active policy adaptation, citing as evidence poorly developed internet accessibility for students and inadequate training of teachers alongside suggested policy alterations of improved infrastructural support and teacher development. Its contribution to debates on digital inclusion and blended learning models of teaching is appreciable, especially given the shifts to education systems after the pandemic.

There are still some limitations that need to be addressed. These findings may not be as relevant for the rest of the public education system in Sindh, especially for the less accessible and underfunded schools, because the sample size drawn from Aga Khan Board-affiliated schools is relatively small. The biases created by students reporting their own data, such as recall bias and the need to conform to social norms, within the student data might be solved by more research in the future that utilizes the triangulation of teacher and parent methodologies. Each telling of a specific case in the study captures particular unique experiences and contexts which does not allow for tracking how participants adapt to changes over time—in this case, over time adapting to online learning. While the study focuses on the issue of technology barriers and access to them, it could also benefit from balancing this by expanding on other socio-cultural barriers like gender inequities related to access to and use of devices.

The study is important from a conceptual and practical perspective for a number of parties involved. For policymakers, it highlights the critical need for integrated action from governments and NGOs towards funding broadband access, providing subsidized digital equipment, and augmenting teacher training with comprehensive digital pedagogy literacy and teaching methodology frameworks. At the institutional level, the findings encourage model construction that harnesses the pedagogical benefits of combining asynchronous and synchronous learning through greater focus on learner-in-student engagement. The research also suggests further areas of scholarship such as cross-sectional analysis of the provinces and socio-economic group's equity gaps out of systemic inequity silos as well as action research on practical solutions like community Wi-Fi, peer learning networks, and other self-help group interventions.

This study citing students' perspectives and experiences captures how the success of online learning initiatives in Pakistan is fundamentally tied to addressing systemic inequities. While recounting students' remarkable adaptability amidst efforts to shift education to a digital setting, the research captures the ways the public education system's structural barriers continue to stifle the growth of e-tech. The issues highlighted not only present critical challenges but also provide a roadmap toward fostering greater inclusivity in digital

education by asserting that without investment in infrastructure, teacher training, and robust support systems, the reliance on technology will not enact meaningful change. Expanding the scope of this study in terms of geography and demographics will enable a nuanced understanding of context-sensitive solutions that are scalable across Pakistan's diverse educational systems.

Conclusion

This research highlights the hybrid nature of online learning for public school students in Sindh – while it offered digital continuity in education during the pandemic, issues like lack of adequate infrastructure, teacher-student interactions, and insufficient support structures hindered its effectiveness. Such students illustrate the gaps that exist between the promises of a digital education and its delivery in low-resourced environments. Optimal outcomes will be achieved only through a holistic endeavor of building sustainable digital infrastructure, equipping teachers with online teaching methodologies, and developing adequate local-level participatory engagement models tailored to students. These insights expand the scope of existing literature but also urge Pakistani policymakers to pay immediate attention towards equitable, sustainable, and inclusive digital education reform. Without such approaches, online learning will not only fail to transform but risk deepening educational inequalities in the region.

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