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Assessing Improvements in Accessibility and Student Perspectives on eLearning in Rural Schools in Bhutan During the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic severely impacted education worldwide, resulting in widespread school closures and an abrupt shift to eLearning. This study examines the accessibility of eLearning and students' experiences during the COVID-19 pandemic in a rural school in Bhutan, focusing on the initial and later phases of emergency eLearning. Data were collected in two rounds—March 2020 and June–August 2022—using census and surveys to capture changes in device access, connectivity, parental support, curriculum relevance, and overall satisfaction. Findings show significant improvements in access to smartphones and modest improvements in BBS TV and laptops, which facilitated gradual adaptation to eLearning. However, reliable internet connectivity declined, parental support decreased, and challenges related to timetables and curriculum persisted, limiting the effectiveness and equity of learning. Overall satisfaction improved moderately, suggesting device accessibility as a key enabler of engagement. Based on these results, the study recommends targeted policies to provide equitable device access, strengthen digital infrastructure, enhance parental support, among others to ensure sustainable and inclusive eLearning in rural Bhutan.

Keywords: COVID-19, eLearning, Bhutan, rural schools.

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Introduction

The novel coronavirus disease (COVID-19) was first identified in Wuhan, China, in December 2019 (Chahrour et al., 2020; Zhu et al., 2020). The virus spread rapidly across the globe, with thousands of new infections reported daily. On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic, urging people to practice social distancing and advising those with mild respiratory symptoms to self-isolate (Cucinotta & Vanelli, 2020; Zhu et al., 2020). In response, governments worldwide implemented a series of stringent public health measures, including frequent handwashing, restrictions on social gatherings, respiratory hygiene practices, and nationwide lockdowns (Cucinotta & Vanelli, 2020; Zhu et al., 2020). These restrictions led to the temporary closure of many socio-economic activities that relied on in-person interaction—including those in the education sector.

The global education system had already been shifting gradually toward digital learning, and the pandemic accelerated this transition. Rashid and Yadav (2021) had predicted that online learning would become mainstream by 2025. However, in Bhutan, eLearning remained in its early stages, even at the tertiary level. The country's first major online learning platform, the Virtual Learning Environment (VLE), was introduced in 2011 for colleges, but its use was limited. Both students and faculty faced several challenges, including poor internet connectivity, limited access to digital resources, and a lack of training in ICT-integrated pedagogy (Choeda et al., 2016; Kinley, 2015).

The onset of the COVID-19 pandemic forced schools and educational institutions worldwide to adopt online learning abruptly. Bhutan, like many developing countries, was largely unprepared for this rapid transition. While eLearning provided a temporary solution, the sudden shift exposed deep-seated challenges, particularly in rural schools where limited infrastructure, poor internet connectivity, and lower digital literacy exacerbated educational inequalities (Holmarsdottir, 2024; Monnat, 2022; Education Monitoring Division, 2021). These constraints not only disrupted learning during the pandemic but also risked widening long-term disparities in

educational outcomes between urban and rural students (Fahle et al., 2023; Schwartz et al., 2021).

Although international organizations such as the World Bank, UNICEF, and UNESCO, as well as the Ministry of Education and Skills Development of Bhutan have reported on the broad impacts of school closures, there remains limited academic research especially on rural Bhutanese schools (Education Monitoring Division, 2021; Wangdi & Rai, 2022; Wangdi et al., 2021). Given that more than half of Bhutan's population resides in rural areas (National Statistics Bureau, 2021), understanding their unique experiences is critical for ensuring equitable access to education in times of crisis.

To address this gap, the present study examines both the accessibility of eLearning and students' experiences during the abrupt transition to eLearning in rural schools, focusing on the initial phase as well as the subsequent progress and adjustments made throughout the pandemic. By situating the analysis in a rural setting, the study not only documents the lived realities of learners but also identifies opportunities for strengthening resilience and preparedness in Bhutan's education system. In doing so, it offers context-specific insights that can inform targeted policy interventions and guide future strategies for inclusive and productive online learning experiences during similar crises in the future.

Literature Review

COVID-19 caused unprecedented disruption and posed severe challenges to education systems globally. Schools, colleges, and universities were closed, affecting more than 1.6 billion learners across 200 countries (Rashid & Yadav, 2020; UNESCO, 2020a). According to UNESCO (2020b), an estimated 24 million students were at risk of never returning to school. Between March 11, 2020, and February 2, 2021, schools were fully closed for an average of 95 instructional days worldwide—equivalent to roughly half the academic year (UNICEF, 2021a). From February 2020 to August 2021, educational institutions were fully closed for an average of 121 days and partially closed for another 103 days globally (World Bank et al., 2021).

Education institutes responded by instigating different remote learning modalities. This included eLearning, television broadcasts, radio programming, and the provision of print packages (Education Monitoring Division, 2021; Pavlas et al., 2021; World Bank et al., 2021). eLearning was one of the most widely adopted methods worldwide (Guangul et al., 2020; Rashid & Yadav, 2020). A 2020 survey conducted by UNESCO et al. (2020) encompassing 149 ministries of education worldwide, reported that almost all the respondent countries had adopted online platforms, television or radio broadcasts. 89 percent had introduced at least one measure to enhance access to the electronic devices and connectivity needed for online learning (such as making access to mobile devices at subsidized or no cost). Similarly, measures were taken to support children without access to eLearning, which included take-home packages and home visits by teachers (Guangul et al., 2020; Rashid & Yadav, 2020). Some countries, like the Czech Republic and Japan, had also provided supports to teachers, parents, and caregivers (Pavlas et al., 2020).

Notwithstanding various initiatives undertaken by governments and educational institutions, the impact of the pandemic on education was both dramatic and transformative. The abrupt transition from face-to-face instruction to eLearning posed significant challenges across countries—both developed and developing, large and small (Rashid & Yadav, 2020). Key obstacles included digital inequality, limited digital competence, communication barriers, and financial constraints (Heng & Sol, 2021; Monnat, 2022; Rashid & Yadav, 2020). Likewise, assessment and supervision were also major challenges during the emergency eLearning (Adedoyin & Soykan, 2020; Guangul et al., 2020). While these issues were encountered globally, the impact was more prominent in developing countries and rural regions (Katz et al., 2021; Muñoz-Najar et al., 2021; Pokryszko-Dragan et al., 2021). Consistent with these global challenges, Bhutan's response to the pandemic, particularly in the education sector, was characterized by similar initiatives and obstacles.

COVID-19 Responses and Emergency eLearning in Bhutan

Bhutan, a small, developing Himalayan kingdom with over 52 percent of its population living in rural regions (National Statistics Bureau,

2021), reported its first confirmed case of COVID-19 on March 5, 2020 (LeVine et al., 2020). One year later, as of January 25, 2021, the country had recorded 855 positive cases, with 725 recoveries and one death (Gyaltshen & Pelden, 2021). Despite limited health specialists—only 376 doctors and 1,364 nurses nationwide (Dorji, 2021)—Bhutan's response was widely recognized as exemplary. The pandemic brought out unprecedented solidarity, leadership, and collective responsibility. Volunteer organizations played a crucial role in containment and response (Dorji, 2021). To illustrate, thousands of teachers formed the Volunteer Teachers of Bhutan (V-ToB) group to engage students during the first national lockdown, while the DeSuung programme, with more than 15,000 members, patrolled borders, monitored lockdowns, enforced safety protocols, and distributed essentials (Dorji, 2021). By July 2021, Bhutan had vaccinated 90 percent of its adult population within just three weeks (Schiffling & Phelean, 2021). Hence, Bhutan was frequently cited among global success stories in pandemic response. Nonetheless, while Bhutan's public health measures drew international praise, the education sector simultaneously faced the urgent challenge of sustaining learning for thousands of students across the country.

In 2020, there were 528 schools and 78 extended classrooms (170,000 students), 18 tertiary institutes (12,297 students), and eight technical training institutes (1,793 trainees) in Bhutan (Ministry of Education, 2020). Schools in high-risk areas were closed on 6 March 2020, and by 18 March, all educational institutions nationwide were closed as a precaution against the outbreak, remaining fully closed until September 2020 (UNESCO & UNICEF, 2021). To manage this disruption, the Education Emergency Operation Centre activated measures under the Education Disaster Response Plan, including curriculum modifications and alternative modes of teaching and learning (Education Monitoring Division, 2021). On 26 March 2020, the Ministry of Education (now the Ministry of Education and Skills Development) launched *Bhutan e-Learning* and issued the *Guidelines for Curriculum Implementation Plan for Education in Emergency (EiE)* (Ministry of Education, 2020). The following sections briefly discuss Bhutan's emergency education strategies during the pandemic.

Modifying Curriculum

In response to the pandemic, the Ministry of Education, in collaboration with the Royal Education Council, developed a provisional curriculum known as the *Adapted Curriculum*. This short-term emergency intervention was designed to ensure continuity of learning, with lessons delivered through online platforms and national television broadcasts (Education Monitoring Division, 2021). For primary students (Pre-Primary to Grade 6), the curriculum emphasized basic literacy and numeracy skills, while for higher grades (Grades 7 to 12), it adopted a theme-based, conceptual learning approach (Royal Education Council, 2020).

While the *Adapted Curriculum* continued to be used for students in lower grades (Pre-Primary to Grade 8), the Royal Education Council introduced a *Prioritized Curriculum* for senior grades (Grades 9 to 12) starting from the second term of the 2020 academic year (Ministry of Education, 2020). Unlike the Adapted Curriculum, the Prioritized Curriculum aimed to deliver essential core contents (Royal Education Council, 2020). However, its implementation was limited to high schools that had reopened. Schools located in high-risk zones, which remained closed, continued following the Adapted Curriculum.

Different Modes of Lesson Delivery

Lessons were primarily delivered through national television via the Bhutan Broadcasting Service (BBS) (Education Monitoring Division, 2021; UNESCO & UNICEF, 2021). The V-ToB initiative recorded lessons that were aired on BBS television (Dorji, 2021). A sample broadcast schedule is presented in Table 1. Subsequently, video lessons were disseminated through various social media platforms (Kuenga & Wangchuk, 2022).

In addition to the national broadcasts, teachers in schools delivered lessons through Google Classroom and social media platforms, primarily WeChat and Facebook Messenger groups (Kuenga & Wangchuk, 2022). Schools developed customized timetables to facilitate remote learning (Kuenga & Wangchuk, 2022), similar to the example presented in Table 2.

Table 1
Sample schedule of TV lesson broadcasts (27 – 31 July 2020)

Subject	Key stage 1 (PP to primary III)	Key stage 2 (IV to primary VI)	Key stage 3 (VII to primary IX)
Dzongkha	28 minutes	54 minutes	-
English	62 minutes	58 minutes	53 minutes
Maths	52 minutes	101 minutes	102 minutes
Geography	-	-	24 minutes
Science	-	-	35 minutes

Note: Adapted from Bhutan Case Study: Situation Analysis on the Effects of the Responses to COVID-19 on the Education Sector in Asia by UNESCO and UNICEF, 2021.

Table 2
Sample customized timetable developed at schools (March, 2020).

	Monday		Tuesday		Wednesday		Thursday	
	Morn	Aft	Morn	Aft	Morn	Aft	Morn	Aft
X	Eng.	Bio.	Dz.	Chem.	Math	Geo.	Phy.	Hist.
IX	Dz.	Bio.	Eng.	Chem.	Phy.	Hist.	Math	Geo.
VII	Eng.	Geo.	Dz.	Hist.	Math	Sci.	Phy.	Math
VII	Dz.	Hist.	Eng.	Geo.	Math	Sci.	Math	Phy.

Note: Adapted from Kuenga and D. Wangchuk (2022), Challenges of Emergency ELearning in Rural Bhutan: A Case of Kengkhar Middle Secondary School During the COVID-19 Pandemic Asian Journal of Education and Social Studies, 26(3), p. 13.
Abbreviation Key: Bio.: Biology; Chem.: Chemistry; Dz.: Dzongkha; Eng.: English; Geo.: Geography; Hist.: History; Math: Mathematics; Phy.: Physics; Sci.: Science

Methodology

This research used a quantitative approach as it allows for the systematic, objective measurement and analysis of variables related to eLearning accessibility and students' perspectives. The method is particularly effective in providing numerical data that can be used to assess patterns, trends, and improvements over time (Creswell, 2009).

Study Site and Participants

The study was conducted at Kengkhar Middle Secondary School (Kengkhar MSS), and the participants were students from pre-primary to grade ten. Kengkhar MSS was selected for two main reasons. First, the school is located in a rural Kengkhar community, where challenges in implementing emergency eLearning were particularly acute and remain underexplored in existing studies (Kuenga & Wangchuk, 2022). Rural schools often face greater infrastructural, technological, and connectivity limitations, making them critical contexts for understanding the equity and effectiveness of eLearning initiatives during the COVID-19 pandemic (Monnat, 2022; Education Monitoring Division, 2021).

Second, the researcher was a teacher at Kengkhar MSS during the COVID-19 school closures, providing both accessibility to the site and an insider perspective on the lived experiences of teachers and students. Practical considerations also influenced this choice: travel restrictions and health risks during the pandemic limited access to multiple sites. Conducting the study at the school where the researcher was stationed minimized exposure risks while still allowing for an in-depth exploration of eLearning challenges. Thus, the choice of study place was also a convenience sampling, which was unavoidable during the pandemic. Nonetheless, systematic data collection (such as the census) and triangulation were applied to minimize potential bias.

Data Collection

Data were collected in two rounds. The two rounds of data collection facilitated a longitudinal analysis, which enabled the identification of trends and improvements in accessibility and student perspectives over the course of the COVID-19 pandemic (Menard, 2002). The first round was conducted in March 2020, at the onset of school closures and the transition to emergency eLearning. The second round took place during the later phase of the pandemic, between June and August 2022, capturing experiences after more than two years of eLearning.

Two instruments were used: a census and an online survey. The census gathered data on students' access to essential eLearning resources, including BBS television, smartphones, internet

connectivity, and other eLearning devices at home. The online survey explored students' challenges, perceptions, and experiences with eLearning. To accommodate varying accessibility, the survey was administered via three approaches: (a) emails for senior students, (b) phone calls for primary-level students, and (c) in-person collection for students residing near the school campus. In the first round, 305 students participated, responding to online survey statements on a five-point Likert scale: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (DA) and Strongly Disagree (SDA). In the second round, 353 students participated in the online survey as presented in Table 3.

Table 3
Overview statistics of the participants involved in the study.

	Round One (2020)	Round Two (2022)
Number of participants for census	549	501
Number of students for online survey	305	353

Data Analysis

The data collected from the census and online survey were analyzed using SPSS. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarize the accessibility of eLearning devices, network facilities, and students' perspectives during the two phases of the COVID-19 pandemic. To examine changes over time, comparisons were made between the initial phase (March 2020) and the later phase (June–August 2022). For continuous or approximately interval variables, paired-sample t-tests were conducted for repeated measures, while independent-sample t-tests were used when the respondents differed across phases. Chi-square tests were applied to assess significant differences in categorical variables, such as device ownership or internet access.

Results and Findings

Access to eLearning Devices and Facilities

The accessibility of eLearning devices and facilities among students changed remarkably between the initial phase of the COVID-19 pandemic (March 2020) and the later phase (June–August 2022). As shown in Table 4, the proportion of students with access to BBS TV increased significantly from approximately 35% in 2020 to about 46% in 2022 (χ^2 (1) = 12.13, p = 0.0005). This indicated a notable improvement in access to broadcast-based learning. Likewise, personal smartphone ownership more than doubled, rising from 10.38% to 23.75% (χ^2 (2) = 46.82, p < 0.001), while reliance on smartphones belonging to parents or guardians decreased from 79.78% to 73.05%. This suggested a gradual shift toward greater student autonomy and convenience in accessing eLearning resources in the later phase of the pandemic.

Table 4
Accessibility of eLearning Devices and Facilities Among Students in 2020 and 2022.

Variable	Category	2020 (n, %)	2022 (n, %)	x^2(df)	p-value
BBS TV	Yes	192 (≈35%)	229 (≈46%)	12.13 (1)	0.0005
	No	357 (≈65%)	272 (≈54%)		
Smart phone	Personal	57 (≈10%)	119 (≈24%)	46.82 (2)	<0.001
	Parents/Guardian	438 (≈80%)	366 (≈73%)		
	None	54 (≈10%)	16 (≈3%)		
Internet	Yes	466 (≈85%)	352 (≈70%)	31.69 (1)	<0.001
	No	83 (≈15%)	149 (≈29%)		
Laptop or Desktop	Yes	17 (≈3%)	35 (≈7%)	8.43 (1)	0.0037
	No/None	532 (≈97%)	466 (≈93%)		

Note: Percentages are based on total respondents in each year. χ^2 = Chi-square statistic; df = degrees of freedom. *p < 0.01 indicates statistically significant difference.*

However, access to a reliable internet connection declined significantly over the same period, falling from 84.88% in 2020 to 70.26% in 2022 (χ^2 (1) = 31.69, p < 0.001). Access to laptops or

desktops, on the other hand, showed a modest but statistically significant increase from 3% to 7% (χ^2 (1) = 8.43, p = 0.0037).

These findings suggest that, accessibility to eLearning devices generally improved over the two-year period. However, persistent limitations in infrastructure, particularly a reliable internet connection continued to constrain effective eLearning.

Students' Perspectives of eLearning

Next, we surveyed students' experiences and perspectives on emergency eLearning. The survey statements are grouped under four themes: parental support, time factor, curriculum, and learning outcome. Relevant survey statements and their responses are presented in Table 5.

Table 5
Students' Perspectives on eLearning Between 2020 and 2022 (%).

Statement	Round 1 (%)				
	SA	A	N	DA	SDA
I received support from my parents or guardians for eLearning	45	40	9.5	3.6	1.9
eLearning timetable was suitable	40	43	11	5	1
The workload was manageable	19	41	21	16	3
Contents taught were relevant and important	52	35	6	5	2
Overall eLearning satisfaction during the pandemic.	2	9	24	30	35
	Round 2 (%)				
I received support from my parents or guardians for eLearning	27	48	10.7	12.6	1.7
eLearning timetable was suitable	12	46	22	17	3
The workload was manageable	7	53	24	13	3

Contents taught were relevant and important	42	21	24	8	5
Overall eLearning satisfaction during the pandemic	29	21	29	15	6

The percentage responses for each Likert-scale statement were converted into numeric codes (SA=5, A=4, N=3, DA=2, SDA=1) to compute means and standard deviations. This standard practice allows ordinal survey responses to be summarized quantitatively and analysed using parametric tests such as t-tests to assess significant changes over time (Allen & Seaman, 2007; Norman, 2010). Paired-sample t-tests were then conducted to assess whether changes in perceptions between Round 1 (March 2020) and Round 2 (June–August 2022) were statistically significant ($p < 0.05$). The results are presented in Table 6.

Table 6
Students' Perspectives on eLearning During COVID-19 (Means and SDs)

Statement	Round 1 Mean (SD)	Round 2 Mean (SD)	t	p
I received support from parents/ guardians	4.23 (0.9)	3.87 (1.01)	-6.12	<0.001
eLearning timetable was suitable	4.16 (0.87)	3.47 (1.03)	-11.3	<0.001
The workload was manageable	3.57 (1.07)	3.48 (0.97)	-1.91	0.06
Contents taught were relevant and important	4.30 (0.87)	3.87 (1.12)	-6.9	<0.001
Overall eLearning satisfaction	2.13 (1.10)	3.52 (1.11)	20.46	<0.001

Note: Means and SDs computed using numeric coding of Likert scale (SA=5 to SDA=1). t = paired-sample or independent t-test depending on whether respondents were the same.

The analysis of students' perceptions of eLearning during the COVID-19 pandemic revealed both improvements and persistent challenges. Regarding parental support, students reported high levels of assistance in Round 1 (Mean = 4.23, SD = 0.9), which declined significantly in Round 2 (Mean = 3.86, SD = 1.01), a difference that was statistically significant ($t = -6.12$, $p < 0.001$). Similarly, the perceived suitability of the eLearning timetable decreased from Round 1 (Mean = 4.16, SD = 0.87) to Round 2 (Mean = 3.47, SD = 1.03), with the change also being significant ($t = -11.3$, $p < 0.001$). Students' views on the manageability of workload remained relatively stable (Round 1: 3.57, SD = 1.07; Round 2: 3.48, SD = 0.97; $t= -1.91$, $p = 0.06$), indicating no significant change over time. Perceptions of content relevance showed a significant decline from Round 1 (Mean = 4.30, SD = 0.87) to Round 2 (Mean = 3.87, SD = 1.12; $t = -6.9$, $p < 0.001$). Nonetheless, in contrast, overall eLearning satisfaction improved markedly, increasing from 2.13 (SD = 1.13) in Round 1 to 3.52 (SD = 1.11) in Round 2, with the increase being highly significant ($t = 20.46$, $p < 0.001$).

These findings indicate that while certain aspects of eLearning, such as parental support, timetable suitability, and content relevance, declined over time, students' overall satisfaction with eLearning improved. This suggests adaptation and gradual improvement in eLearning experiences.

Overall, the results indicate a mixed pattern of change over time. While access to personal smartphones and BBS Television improved, access to laptops/desktops remained limited although the improvement was statistically significant. In contrast, the internet connectivity declined significantly. Nonetheless, students' perceptions show a significant increase in overall satisfaction with eLearning, even though the internet connection, parental support, timetable suitability, and content relevance decreased. This suggests that access to essential devices was a strong predictor of students' eLearning experiences. It highlights the critical role of device accessibility in shaping outcomes, particularly within rural eLearning contexts.

Discussion

The aim of this study was to assess the accessibility of eLearning devices and facilities, as well as students' perspectives, across two phases of the COVID-19 pandemic in rural schools in Bhutan. The findings reveal both progress and persistent barriers, offering important insights into the equity and effectiveness of eLearning programme during the pandemic.

Accessibility of eLearning Devices and Facilities

Smartphones emerged as the most accessible eLearning device for students in rural Bhutan. Two years after the implementation of eLearning, personal ownership rose significantly, while dependence on parents' or guardians' devices declined. Consistently, the proportion of students with no smartphone access dropped, suggesting notable progress in device availability. Nonetheless, the continued reliance of many students on shared devices highlights persistent limitations. Students who depend on others for digital tools are at greater risk of social exclusion and interrupted learning (Holmarsdottir, 2024; UNICEF, 2021b). Their access is often irregular and constrained by competing household demands (UNESCO & UNICEF, 2021; Bernama, 2020). Similar findings have been reported in other developing contexts, where limited personal ownership undermined the continuity of online learning and reinforced existing educational inequalities (Muñoz-Najar et al., 2021; UNICEF, 2021b).

Similarly, the proportion of students with access to BBS TV increased significantly from 35% to 46% over the two years of emergency eLearning. Access to laptops or desktops also showed a modest but statistically significant increase from about 3% to 7%. Nonetheless, access to large-screen devices remained limited. More than half of the students still lacked access to BBS TV, and only a small fraction (7%) had access to laptops or desktops during the later phase of eLearning. This persistent scarcity has important implications. Studies show that while smartphones are the most readily available devices, larger screens such as TVs and computers are more effective for sustained engagement, complex tasks, and

interactive learning (UNESCO & UNICEF, 2021; OECD, 2020). Reliance on smartphones alone often restricts students to passive content consumption and short interactions, limiting opportunities for deeper learning (International Labour Organization & United Nations Children's Fund, 2020).

Despite significant improvements in access to basic eLearning devices, internet connectivity remained a persistent challenge. Reliable access declined over time, with 89% of students reporting stable connections in 2020 compared to only 70% in 2022. This downward trend highlights the fragility of digital infrastructure in rural Bhutan, where affordability issues and unstable networks continue to undermine consistent eLearning (Education Monitoring Division, 2021; Pokhrel & Chhetri, 2021). Such constraints suggest that improvements in device ownership alone are insufficient to guarantee meaningful participation in digital learning. Without parallel investments in affordable and reliable internet services, rural students remain at risk of disrupted learning, limited interactivity, and widened educational inequalities. These findings mirror regional studies that describe the 'second-level digital divide,' where infrastructure may exist but remains unreliable or inaccessible for educational purposes (Lythreatis et al., 2022; Wangdi et al., 2021).

Students' Perspectives on eLearning

Survey results reveal notable shifts in students' experiences and satisfaction with eLearning. Parental support, which was initially high, declined sharply by 2022. For instance, while 45% of students strongly agreed in 2020 that they received parental support, this proportion fell to 27% in the second round. This decline contrasts with the heightened need for parental involvement during prolonged school closures (Pavlas et al., 2021; Pokhrel & Chhetri, 2021; Wangdi et al., 2021). The pattern reflects symptoms of pandemic fatigue, as parents struggled to balance economic pressures, caregiving responsibilities, and academic support (Amirudin et al., 2021). Reduced parental engagement has important implications: it not only undermines the continuity of eLearning but also risks widening educational disparities, particularly in rural households where parents may have limited digital literacy or resources to compensate for the lack of

formal schooling (Amirudin et al., 2021; Education Monitoring Division, 2021).

Similarly, approval of eLearning timetables declined sharply from 83% in 2020 to 58% in 2022. Many students faced competing demands at home—including household chores, farm work, and caregiving responsibilities—that disrupted their ability to follow structured schedules (Education Monitoring Division, 2021). Perceptions of curriculum relevance also weakened over time. During the initial phase, when Bhutan introduced the Adapted Curriculum, 87% of students reported the content as relevant; by 2022, under the Prioritized Curriculum, this dropped to 63%. This decline illustrates broader pedagogical challenges in transitioning from emergency adaptations to more formalized structures. As Zhao and Watterston (2021) and Muñoz-Najar et al. (2021) argue, post-pandemic education requires fundamental curricular reforms. Yet, relevance is not determined solely by the content itself but is shaped by contextual realities, students' psychological readiness, and delivery conditions. The findings suggest that without aligning curricular design with students' lived experiences and learning environments, even well-intended reforms may fail to sustain engagement or meet learners' needs.

Despite persistent challenges, students' overall satisfaction level with eLearning showed a significant improvement: while only 2% of students reported being 'strongly satisfied' in 2020, this rose to 29% in 2022. This improvement appears closely linked to the increased accessibility of eLearning devices over the same period, particularly smartphones, which emerged as the most widely available tool, along with modest gains in access to BBS TVs and laptops. Greater device availability likely enabled students to participate more consistently in online learning, fostering gradual adaptation even as frustrations with workload, curriculum relevance, and connectivity persisted. Similar patterns have been documented internationally, where learners' resilience in online education was supported by access to appropriate tools, but quality and sustainability remained persistent concerns (Selvaraj et al., 2021; Heng & Sol, 2021; Muñoz-Najar et al., 2021). These findings suggest that device accessibility is a critical prerequisite for effective eLearning in rural contexts.

Policy Recommendations

Equitable Provision of Digital Devices

The government should consider providing digital devices or subsidies to enable students in rural areas to acquire personal eLearning tools (Education Monitoring Division, 2021). Schools can complement this by implementing resource-sharing initiatives, peer coaching, mobile teachers, and support from elder siblings to assist students who lack access to eLearning (UNESCO & UNICEF, 2021).

Strengthening Infrastructure for eLearning

Persistent barriers to broadcast-based learning, including affordability and technical limitations, highlight the need for investment in infrastructure. Partnerships with Bhutan Telecom Limited and Tashi InfoComm should aim to enhance communication networks in rural regions. The Ministry of Industry, Commerce, and Employment should prioritize expanding KU Band Satellite Dish coverage to improve access to BBS television channels, supporting both emergency eLearning and broader rural information access (Tshering, 2020; Wangdi et al., 2021).

Integration of Online Learning Platforms

Schools should explore and integrate online platforms such as Google Classroom and Zoom into regular teaching and learning, ensuring preparedness for future disruptions. This will also support digital literacy and continuity of education beyond emergency contexts.

Parental Engagement and Capacity Building

Active parental involvement is essential for effective eLearning. Policies should include orientation programmes and training for parents and caregivers in rural areas to provide academic guidance and support learning at home, as preparatory measures for emergency eLearning in the future.

Curriculum Adaptation and Flexibility

Curriculum developers and teachers should design a flexible, developmental, and personalized curricular framework that can be

adapted at the school level during emergencies (Zhao & Watterston, 2021; Pavlas, 2021). This ensures continuity of learning and allows content and delivery to align with students' contexts, readiness, and resources.

Localized and Context-Sensitive Measures

Given Bhutan's mountainous geography, emergency measures should be localized rather than uniformly applied nationwide. Rural schools, where students were less affected by pandemic risks but had limited digital resources, could maintain in-person learning with safety protocols, while urban schools with higher risks may rely more heavily on eLearning (UNESCO & UNICEF, 2021).

Limitations and Future Research

This study was conducted in one school due to movement restrictions during the pandemic, which limits the generalizability of the findings. In addition, the data were self-reported by students, which may introduce response bias. Future research should expand to include comparisons between urban and rural contexts, incorporate perspectives of teachers and parents, and investigate the long-term impacts of emergency eLearning on student learning outcomes and engagement.

Conclusion

This study highlights the evolving landscape of emergency eLearning in rural Bhutan during the COVID-19 pandemic. Over two years, access to eLearning devices—particularly smartphones—improved significantly, which suggested enhanced access to eLearning and gradual adaptation. However, persistent limitations in larger-screen devices, reliable internet connectivity, parental support, timetable suitability, and curriculum relevance constrained the effectiveness and equity of learning. Overall satisfaction improved, suggesting that device accessibility is a critical enabler of eLearning, but meaningful and sustainable outcomes require complementary investments in infrastructure, parental involvement, and contextually relevant

curriculum design. These findings underscore the need for targeted policies that address both technological and socio-pedagogical dimensions to ensure equitable and resilient education in rural contexts.

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