ONLINE LEARNING DURING THE COVID-19 PANDEMIC

A REVIEW OF STUDENT EXPERIENCES IN ASIAN HIGHER EDUCATION

DECEMBER 2023

ASIAN DEVELOPMENT BANK

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ADB recognizes "Korea" and "South Korea" as the Republic of Korea, "Vietnam" as Viet Nam, and "Hanoi" as Ha Noi.

Unless otherwise stated, the source for all the tables in this publication is Asian Development Bank.

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Contents

Tables

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Abbreviations

ADB	Asian Development Bank
CHED	Commission on Higher Education (Philippines)
COVID-19	coronavirus disease
DepEd	Department of Education (Philippines)
DMC	developing member country
HEC	Higher Education Commission (Pakistan)
HEI	higher education institution
ICT	information and communication technology
LAN	local area network
LMS	learning management system
MEC	Ministry of Education and Culture (Indonesia)
MOE	Ministry of Education (Republic of Korea)
MOET	Ministry of Education and Training (Viet Nam)
MOOC	massive open online courses
OECD	Organisation for Economic Co-operation and Development
OER	open educational resources
SES	socioeconomic status
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UPD	University of the Philippines Diliman
WHO	World Health Organization
VCT	videoconferencing tools

Executive Summary

Higher education institutions (HEIs) in Asia and the Pacific used various digital platforms and applications to sustain online learning during the coronavirus disease (COVID-19) pandemic. The HEIs and governments had to consider a range of online learning priorities. Conducted in the first to third quarters of 2020 and 2021, this study examines student experiences in online learning in higher education during the pandemic to help HEIs and governments address gaps in the learning experience, provide students and teachers with better support, and inform future policymaking.

The study surveyed 110,578 students, HEI administrators, and faculty members from six developing member countries (DMCs) of the Asian Development Bank (ADB): Indonesia, Nepal, Pakistan, the Philippines, the Republic of Korea, and Viet Nam. The study developed questionnaires looking into student experiences during the pandemic and could be completed by respondents in either the local language or English. The questions dealt with participation in online learning; internet access, devices, tools, and platforms; proficiency and training needs; available facilities; and funding and policy frameworks. The study sent structured questionnaires using the SurveyMonkey program to targeted respondents through a series of online meetings with each ministry of education and HEI network.

Scale of remote learning. More than 85% of students from the six DMCs experienced remote learning during the COVID-19 pandemic. Distance education has been a much-discussed topic in open or virtual universities or island and mountainous countries according to many studies, but is not generally a main instructional approach in higher education. With the sudden change to remote education during the pandemic, most university students in the six DMCs had been learning online. About 20%, however, still studied both online and offline (as of May 2022).

Devices used. Students relied mainly on smartphones and laptops for online learning. Students in the six DMCs already used mobile devices to some extent even before COVID-19, but their use for learning purposes increased during the pandemic. These usage patterns will allow policymakers to draft key policies for providing these smartphone users with online education support such as free or reduced-cost mobile data plans.

Internet connection. The type of internet used by students varied by country. Students in Indonesia and Pakistan, for example, mainly used mobile broadband at home, while students in Nepal, the Philippines, and Viet Nam mostly depended on landline connections (e.g., Wi-Fi). Many college students owned smartphones and were adequately equipped to participate regularly in online learning, but mobile data plans were less than moderately affordable.

Student preference: online versus face-to-face learning. The majority of student respondents in the six DMCs did not prefer the online mode of learning alone. Instead, they preferred a combination of both modalities if fully on-site classes were not feasible. If universities are compelled to adopt online learning—such as during a pandemic—reports on the student online learning experience highlight the necessity of further enhancing and improving online education.

Student satisfaction. During COVID-19, student satisfaction with the overall remote learning experience was high at 70%–80%. However, students responded that they did not prefer an online-only learning environment. To foster successful learning experiences and engagement, pedagogical strategies must be applied and experiences designed together which include support for student remote learning environments.

Interaction with peers and professors. The level of interaction with peers in the remote learning environment during the pandemic was low, according to the study results. Students also interacted much less with their teachers. An in-depth analysis of the findings brought to light other facts about the student remote learning experience. For instance, students with a higher level of interaction with their teachers—despite the barriers during the pandemic—were more satisfied with the learning experience and more strongly engaged. This explains the importance of student–teacher interaction in the online learning environment for richer student satisfaction.

Student performance. Students reported that their knowledge and skills attained through remote learning ranged from moderately low to moderately high. Other factors show how the online learning experience can either strengthen or weaken student performance.

Funding sources. During COVID-19, the mix of universities—private and public—largely determined the source of funding needed to cope with the changes caused by the pandemic. In Indonesia and the Philippines—where most universities are private institutions—funding by the schools themselves was high. In the case of Viet Nam—with its mostly public universities—funding came mainly from the government.

Major challenges. Teachers and HEI administrators recognized that the major challenges posed by remote learning during the pandemic were (i) limitations on student access to the needed infrastructure and devices and (ii) a lack of teacher know-how in remote teaching and learning, which included poor engagement with students and difficulties in assessing student performance.

Overall satisfaction with remote learning, based on socioeconomic status. Overall satisfaction with the remote learning experience during the COVID-19 pandemic differed between students in the low-socioeconomic status (SES) group and those in the high-SES group. The difference between low-SES and high-SES students was found to be within 10%, apart from that of the Republic of Korea at 23.9% (low-SES) versus 40.2% (high-SES).

Policy-level strategies. Research on this study suggests several national and international policy-level strategies strengthened online learning in higher education during the COVID-19 pandemic and beyond:

(i) To improve the availability of online learning during and after the pandemic, governments needed to make mobile networks more accessible, devices more affordable, and low-cost mobile data plans more available to students. Policy priorities need to focus on building a suitable online learning environment for students. This may include providing students with funds for the purchase of online learning devices and supporting on-campus residence for students in unsuitable environments (e.g., where internet access is poor).

(ii) To engage students in online learning during the COVID-19 pandemic, horizontal communication was preferred and was perceived as an important condition for class management, teaching, and learning for good-quality education and performance. In all the DMCs surveyed, students and teachers pointed to the lack of preparation and practice in remote learning before the pandemic and the abrupt shift to online learning as the main reason for the difficulty in communication between students and teachers. HEI teacher training should be supplemented to improve online communication skills. The cultural context may have also affected the level of fairness in student–teacher communication. Despite the difficulties, students in most of the DMCs surveyed said they were satisfied when communications were delivered in real time instead of, for example, via email, social networking services, or posts on LMS bulletin boards.

(iii) Student achievement was influenced by complex and interrelated factors. Family and personal background may be major determinants. A learning gap was found in students from DMCs showing a positive correlation between satisfaction and personal improvement in major knowledge and skills achieved through online learning during the pandemic. Governments can develop and distribute institutional strategies and approaches to guide HEIs in complementing the knowledge and skills of low-achieving students during and after COVID-19.

(iv) Unlike elementary and secondary schools—which are heavily supported by the government—universities were the main investors in online education infrastructure for higher education. HEIs in DMCs need government and international support to build management systems for online learning, internet access and broadband connections, and content development. Governments and international organizations can create inter institutionally shareable online courses and education content by discipline (e.g., a massive open online course platform for virtual mobility). Governments should carefully consider offering more comprehensive, focused, and inclusive support for low-SES students. Although the overall satisfaction levels of the low-SES group were similar to those of high-SES students, low-SES students of each country still reported lower satisfaction with online learning experiences. Addressing this issue is essential to challenge disparities and ensure equal access to quality education.

I. Introduction

Background

The coronavirus disease (COVID-19) pandemic led to an unprecedented socioeconomic crisis and severely affected higher education institutions (HEIs) as it disrupted education worldwide. Social distancing and limited-movement policies within schools to curb the spread of the disease threw university operations and the traditional education system into disarray. According to a report by the United Nations Educational, Scientific and Cultural Organization (UNESCO), 1.3 billion students worldwide—from pre-primary to higher education—were unable to attend school because of school closures (UNESCO 2020). Online teaching and learning became the only option for schools wanting to continue their classes during the pandemic.

To navigate and sustain the education system, universities worldwide responded to the changing reality in different ways. In Asia, most universities closed their campuses in 2020 and tried to implement digitally enhanced teaching and learning institution wide. Global universities moved quickly from face-to-face to online classes. Digital tools used in online classes include learning management systems (LMSs), email, and meeting software such as Zoom and WebEx (Crawford et al. 2020).

Efforts to sustain good-quality education by shifting to online education have their basis in government policies worldwide, including developing member countries (DMCs) of the Asian Development Bank (ADB). Sri Lanka, for instance, has shown exemplary performance in organizing online courses for university students through the joint efforts of individuals, institutions, and the government. Soon after the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic, the highest political leadership took action to deal with some critical obstacles to online learning (e.g., barriers to free internet access). The country's president and the chair of its University Grants Commission went straight to decision-making. As a result, Sri Lanka reportedly gained a level of access to online learning during the pandemic that was not significantly different from that achieved in developed countries (Hayashi et al. 2020). Indonesia, for its part, prepared early for online learning through its Merdeka Belajar–Kampus Merdeka policy, which allowed cross-credit online studies off campus. The policy, released in March 2020, is seen to have advanced the generic application of online learning during the pandemic (Pannen 2021).

Universities in developing and developed countries responded differently when moving to online instruction and management (Crawford et al. 2020). The variability in HEI implementation of online learning and teaching within countries gave rise to different digital strategies to enable students to continue their education. Administrators and faculties had to deal with widespread challenges: schools had to be equipped with effective tools and platforms for online education, and instructors had to reorganize their lectures and evaluation methods for the virtual sphere.

While the digital campus in higher education has grown, a lack of tools, infrastructure, resources, pedagogical approaches, and technology (e.g., reliable internet access) to support teaching and learning emerged as significant obstacles for HEIs (Marinoni, van't Land, and Jensen 2020). Vulnerable to these COVID-19 challenges in distance learning, not all universities in many developing countries in Asia

could assure their students of good-quality and effective learning. For the students, on the other hand, the transition to online education amid localized or countrywide school closures affected their academic work and social life. Those enrolled in universities during this period may have fallen behind their peers academically and socially.

Interest in online learning methods and experience—specifically, the skills teachers must have to teach better and the technical and administrative support that institutions should provide—has grown since the start of COVID-19. Some research has gone into teaching skills that teachers used during the pandemic or that they need to acquire (Rapanta et al. 2020). This research is focused on specific pedagogical content knowledge that teachers aspired to attain as the learning environment shifted from face-to-face to online. Three aspects—social, cognitive, and facilitative—that must be considered to improve teaching skills in virtual settings have been pointed out.

Other research has disclosed how different online LMSs and platforms for online classes could benefit or disadvantage students and teachers (Murphy, Eduljee, and Croteau 2020). Teacher support in giving students timely and meaningful feedback and virtual tutoring, and communicating with them online, was an urgent need (Bao 2020).

Student stress and mental health issues arising from negative learning environments and fear of the virus may have affected student learning during the pandemic. Considering the different circumstances that students from vulnerable communities and families found themselves in, these mental health disruptions could increase stratification among students in educational attainment and academic achievement.

Student inequalities widened in developing countries in Asia and the Pacific during COVID-19 (UNESCO 2020). In some of these countries, the disparities may come to light in a context rarely encountered in more developed countries. Looking into the diverse range of circumstances and addressing the challenges that students and instructors dealt with will give policymakers a clearer perspective on the requirements and difficulties of online learning. They should then be better able to devise strategies that will ensure the provision of fair and effective online learning to the majority.

Universities have had to go through a dynamic change in their teaching spectrum. Knowledge had to be conveyed and received in a starkly different educational setting during the partial or complete closure of HEIs and the shift to online learning. Although the crisis was not perceived as long-lasting, it was expected to transform the concept of space in higher education even after the crisis ended. Online learning is likely to remain part of the student experience.

This new form of education—along with tradition—will lead universities to new opportunities. However, inadequate experience and understanding of this alternative education system in Asia and the Pacific has led many to underestimate its effect on the future of higher education. Challenges in infrastructure, application, resources, instructor and student readiness, and students' individual learning experiences have been specifically mentioned as issues that should be covered in future research. Institutional and governmental priorities must also be reexamined to make sure that online education achieves the desired results in future years.

Despite the costs of online learning to HEIs and governments, some positive outcomes in online education during the pandemic have induced many universities to continue with the changes. With high-quality communication technologies, internet access, and a positive attitude toward change, online education could do much more in the future than merely providing support for face-to-face learning (Aguilera-Hermida 2020, Adedoyin and Soykan 2020). Online learning blended into higher education should be distinguished and systematized beyond the emergency remote learning utilized during COVID-19.

Methodology

The research study was done to investigate the use of e-learning in HEIs in six ADB DMCs: Indonesia, Nepal, Pakistan, the Philippines, the Republic of Korea, and Viet Nam.

The project team adopted the approaches and methods described in this report.

The team developed survey instruments to examine and record online learning experiences in higher education in the selected DMCs and chose an appropriate sampling methodology for the survey. The questionnaire set used was based on the set used in previous surveys conducted by ADB.

The team developed the questionnaires for students, faculty members, and administrators in the selected DMCs. The questions probed into the teaching and learning experience under the emergent move of schools and governments to online learning during the COVID-19 crisis.

The project team requested the ministry of education or association of universities in each selected DMC to distribute the questionnaires through survey links to the respondents (students, faculty members, and administrators) on its behalf.

From the evidence gathered, a draft framework for the survey—with different strategies for good-quality education during the crisis—was prepared (Table 1). The framework was expected to assist in the classification and investigation of the different forms of student online learning in Asia and the Pacific.

This section of the report ends with a brief description of the survey designed for students. To collect data on teacher training for online learning—and school readiness as perceived by faculty members—the team developed additional questions for teachers in each selected DMC.

Table 1: Survey Framework

Dimension	Variables	FC	ST	AD
Participation in online learning	Establishment of communication channels with students to update the functioning of courses and universities	O	O	O
	Curricula and syllabi for online learning	O	O	
	Delivery method (online, offline, or both) and preference	O	O	O
	Blended learning (preference in learning mode, between online and face-to-face; experiences)	O	O	
	University support for remote teaching and learning (e.g., academic and technical support)	O	O	O
	Methods used for teacher–student communication	O	O	
	Types of online learning tools	O	O	
	Online assessment/evaluation	O	O	
	Faculty using technology to enhance teaching and learning	O		O
	Interaction in online learning	O	O	
	Challenges and benefits of online teaching and learning	O	O	O
	Online learning motivation, burden (or pressure)		O	
	Satisfaction with online teaching and learning (type, engagement, operation, and affordability/accessibility)	O	O	

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Table 1 *continued*

Dimension	Variables	FC	ST	AD
Internet access	Internet connectivity at home and on the university campus, for online teaching and learning	O	O	O
	Quality of network (internet bandwidth or speed, stability, audio and video quality, etc.) at home and on the university campus, for online teaching and learning	O	O	O
	Mobile technology (2G, 3G, LTE, etc.) for internet access for online teaching and learning	O	O	
	Affordability of mobile data plans for online teaching and learning	O	O	
Devices, tools, and platform	Devices owned, provided, or on loan from university (laptop, smartphone, tablet, desktop computer, or none)	O	O	O
	Platform for video lectures	O	O	
	Powerful digital devices (computing capacity)	O	O	O
	Availability of adequate software	O	O	O
	Teaching tools used by faculty members (learning management system, web conferencing, collaboration tools)	O	O	
Proficiency and training needs	Preparedness for remote teaching and learning	O	O	
	Proficiency level in using technology tools for online teaching	O	O	
	Capacity-building activities for online learning and teaching (types, hours, etc.)	O	O	O
	Capacity of academic staff to deliver online courses (digital skills training)			O
	Coaching and support for remote learning and teaching	O	O	
	IT staff in IT support teams			O
Digital resources	Digital content provided by teachers (free OERs, free digital resources library, MOOCs, etc.)	O	O	
	Transfer of online course credits			O
	Experience with online course(s) from course platforms	O	O	
	Quality of enrollment in MOOCs (transferable credits, certificates, etc.)		O	
	Faculty-driven creation of learning content	O	O	
	Type(s) of teaching with digital content	O	O	
	Digitalization of books and course materials			O
	On-campus multimedia production studio			O
Facilities	On-campus production studio for online course creation			O
	Support center (call center) on campus			O
Funds and policy	Student loans for digital devices			O
	Government budget and policy support			O
	Funding for the use of technology (from the government, the university, etc.)			O
	Funding sources for the university's online learning			O
	Education budget and efficiency of education expenditures (in technology infrastructure and in access and equity)			O
	University's preparedness for online teaching and learning			O
	University's plan to support online learning			O

continued on next page

Table 1 *continued*

Dimension	Variables	FC	ST	AD
	Plan for learning recovery / resilience / socio-emotional recovery and acceleration for students			O
	Guidelines and protocols for online teaching–learning (student safeguards in online learning)	O	O	O
	Regulations allowing distance learning delivery in higher education			O
	Monitoring and evaluation plans			O
	Preparations for the continuation of online teaching and learning in the future	O	O	
	University–enterprise cooperation			O
	Free internet access on campus			O
Background	Type of university (public/private)	O	O	
	Discipline	O	O	
	Full-time / Part-time	O		
	Student number			O
	Geographic location	O	O	
	Distance of the university from home		O	
	Type of tuition financing		O	
	Socioeconomic status / Family income		O	
	Parents' education		O	
	Gender		O	
	Age	O	O	
	Educational attainment	O		
	Teaching experience	O		
	Position	O		

AD = administrator, FC = faculty, IT = information technology, MOOC = massive open online course, OER = open educational resources, ST = student.

The team administered the questionnaires for the internet-based surveys to a randomly selected sample of undergraduate students who were taking courses for credit at 4-year colleges in the selected DMCs during the COVID-19 pandemic. To recruit respondents in HEIs in each DMC, the project team cooperated with the country's ministry of education or association of higher education institutions. The team conducted the research by associating with in-country research partners in each country. For this process, the Institute of APEC Collaborative Education—based in the Republic of Korea—mediated the connection between these partners and the research team. The intent was to collect random samples of at least 400 university students from each country, with a confidence level of 95%. The project team also planned to collect data from at least 375 HEI faculty members in each of the six DMCs, with a confidence level of 95%.

To collect the survey responses, the project team transmitted ADB's letter of request for cooperation to the ministry of education where the coordinators worked to get official permission. The team looked forward to an introduction to the official association of universities (if any) by the ministry and to cooperative efforts with the association in the implementation of the survey. The ministry of education could also directly recommend universities for inclusion in the survey and connect the project team with those universities.

II. Literature Review

Introduction

This section provides an overview of the literature regarding emergent online learning in HEIs in six ADB DMCs (Indonesia, Nepal, Pakistan, the Philippines, the Republic of Korea, and Viet Nam) during the pandemic.

The project team reviewed the literature on the subject published by DMC governments, scholars, ADB, the Organisation for Economic Co-operation and Development (OECD), UNESCO, the United Nations Children's Fund (UNICEF), and the World Bank. The review helped to clarify the policies and responding strategies outlined for the university learning environment by major universities and governments when COVID-19 broke out around their borders and after it struck their homeland. The team also looked into some of the policy agendas brought up by stakeholders during the implementation of online learning.

Global Online Learning Trends in Higher Education during the COVID-19 Pandemic

Universities worldwide responded to the COVID-19 pandemic crisis by actively pursuing innovation. They have taken creative approaches to rebuilding the higher education system through academic work, exchange programs, digital credentials, shared resources, and strong infrastructure for online and remote learning.

For most universities, the rapid transition to digital learning was unexpected. It was, therefore, impossible for them to provide perfectly prepared online resources or develop effective materials for full-scale online and blended education in HEIs. However, they continued by sharing resources, experiences, and expertise between countries. One example of this global collaboration network of universities is the Association of Commonwealth Universities–led Partnership for Enhanced and Blended Learning, which has scaled up access to high-quality learning in East Africa. Universities in this region used to be short of educational resources. Through the program, they have gained access to teaching resources and expertise, enabling them to deliver high-quality degree courses with a sustainable system of 170 academics (Atherton 2021).

To break through the lack of adequate educational resources, university infrastructure funding, and institutional capacity, universities can now share resources and production systems among themselves. For example, the University Distance Education Center—a resource-sharing project launched with government support in the Republic of Korea in response to the rapid transition to online learning during COVID-19—provides high-quality university distance education across the country at 10 university distance education centers, established and operated in designated regions. The centers share LMSs, remote lectures, and infrastructure for their production, learning content, distance learning innovations, and consulting expertise (An 2021).

The flexibility of the education system, its ability to allow learning from anywhere and at any time, is being challenged (Che Ahmat et al. 2021). Micro-credentials—subunits of credentials that "could accumulate into a larger credential or degree or be part of a portfolio (e.g., digital badges, micromasters, nanodegrees)" (MicroHE 2019, December)—are among the learning complements intended to make traditional degrees more flexible (OECD 2021). Micro-credential initiatives can promote more equitable access to higher education by broadening access to higher education and making it available to learners across all population groups, supporting learners' individual needs and career objectives, and recognizing and valuing the upskilling and reskilling of the labor force (OECD 2021). Micro-credentials have grown in number and diversity globally (Che Ahmat et al. 2021, OECD 2021). The European University for Well-Being, for example, is developing micro-credential programs that are being delivered by seven institutions with support from the European University Alliances. Una Europa—an international network of European research-intensive universities—is also building joint micro-credentials for postgraduate education to be accredited by all partner institutions in the network (Una Europa 2021).

Universities around the world were challenged to ensure the quality of learning outcomes achieved by students through online learning during this period, as they had to consider alternative methods of assessment and proctored online examinations replaced traditional face-to-face examinations (Reedy et al. 2021). Universities adopted proctoring systems—including webcams, website blocking, and activity monitoring—during examinations to deal with concerns about academic misconduct in a digital world (Reedy et al. 2021). The traditional system of examination tended to demonstrate memorization skills rather than student mastery of expected learning outcomes (Atherton 2021).

Online Learning Trends in Higher Education in ADB's Developing Member Countries

Indonesia

In Indonesia, schools in several provinces began closing on 23 March 2020. As a result, they quickly moved courses online (Rahiem 2021). This governmental response affected all of Indonesia's 4,670 colleges and universities under the authority of the Ministry of Education and Culture (MEC), with 8 million students and 294,820 educators. Religious education institutions under the Ministry of Religious Affairs were not affected (Rahiem 2021). Only about 10% of the country's HEIs are state universities; the rest are privately run (Nursjanti, Amaliawiati, and Nurani 2021).

The Government of Indonesia had a policy framework for higher education during the pandemic. Under Merdeka Belajar–Kampus Merdeka (Independent Learning, Independent Campus Policy, Kampus Merdeka)—first implemented by the MEC on 3 March 2020—students have two semesters to engage freely in learning activities outside the classroom with university support and can choose their preferred fields of study (Ministry of Education and Culture, Indonesia, 2021). HEIs, for their part, have freedom and autonomy in administering lectures (Nugroho et al. 2021).

The government supports the digital platform with more than 3,000 teaching and learning modules for HEI instructors and students (Nugroho et al. 2021). It also provides institutional grants for curriculum development, scholarships for students, mobile package assistance, and other facilities to strengthen higher education and blunt the negative impact of the pandemic.

Online learning in Indonesia's HEIs during the pandemic was covered by the government's health and safety protocols: (i) Ministry of Health Circular No. 3 of 2020 on Coronavirus Disease Prevention in the Education

Unit, (ii) Letter No. 36962/MPK.A/HK/2020 of the Minister of Education and Culture on Online Learning and Working from Home to Prevent the Spread of COVID-19, and (iii) Letter No. 35492/A.A5/HK/2020 of the Secretary-General of the Minister of Education and Culture on Coronavirus Diffusion Prevention (Ubaedillah and Pratiwi 2021). To comply with the physical distancing policy, most of the country's HEIs had moved to online teaching and learning by March 2020 in the early stages of the pandemic (Sparrow, Dartanto, and Hartwig 2020; Wargadinata et al. 2020).

The MEC provided Rp7.2 trillion to assist instructors and students with their internet data quota for implementing online learning during the COVID-19 pandemic (Government of Indonesia, MEC 2020).

According to various studies, Indonesia has a relatively low ratio of households with a personal computer: 20.1%–34.0% in 2020, compared with 78% in 2015 and 88% in 2019 for households in Europe with an internet connection (Eurostat n.d.; Saputra et al. 2021; Saleh, Sari, and Alim 2021). Indonesian students prefer smartphones to other devices because of their lower prices and relative ease of use (Nursjanti, Amaliawiati, and Nurani 2021).

In the early days of the pandemic, universities used Google Classroom, WhatsApp, Schoology, Edmodo, and Zoom for online learning. Google Classroom and WhatsApp in particular were the most commonly used media in online teaching and learning (Ubaedillah and Pratiwi 2021).

Many university students had problems with Wi-Fi signals and the purchase costs of data quotas. The country's internet penetration is only 53.7%. But active internet users total 143.3 million, making Indonesia one of the countries with the largest number of internet users in the world (Statista 2019). Internet use gradually increased to 62.4% in 2018. Also, 62.4% of Indonesians have cell phones, which explains why many students use smartphones instead of laptops (Saputra et al. 2021). However, students looking to attend classes using videoconferencing tools (VCTs), such as Zoom or Webex, were faced with the high cost of online learning (Saputra et al. 2021). One study reported that a weak internet signal and the lack of Wi-Fi service have compelled students—especially those living in villages—to climb trees, go to the forest or the mountain slope, or approach a telecommunication tower to get an internet connection (Saleh, Sari, and Alim 2021). The resulting issues in online learning include low class attendance, failure to submit assignments on time, take an exam, problems uploading large files, and using a Zoom conferencing tool.

Instructors and students use WhatsApp to communicate and share instructional materials and course-related multimedia files, mostly because this social media platform is popular among instructors and students, and also because it does not require massive data (Ritonga et al. 2020, Wargadinata et al. 2020). Online dialogue through messaging applications tends to use up less internet quota than VCTs (Saputra et al. 2021).

Surveys done by universities in 2021 reported mixed results regarding students' preferred type of lecture during the COVID-19 pandemic: face-to-face, blended, or fully online teaching and learning (Nursjanti et al. 2021). Generally, students preferred hybrid learning to fully face-to-face or fully online learning. For face-to-face or blended lectures on campus, universities readied facilities, infrastructure, and the various requirements of on-campus learning including lecture preparation, implementation, and monitoring. Each university had to disseminate its teaching and learning policy. The blended teaching and learning model—a mix of offline and online teaching and learning—was tried out in Indonesia in the effort to adapt to change brought about by the pandemic. Some universities held both face-to-face and blended lectures, depending on circumstances, such as the vaccination rate among instructors, parental consent, and the number of students in a classroom (Nursjanti, Amaliawiati, and Nurani 2021).

Most Indonesian universities provided training and professional development for their teaching staff during the pandemic (Sparrow, Dartanto, and Hartwig 2020). Instructors were expected to make online learning work better for their students. One study reported that students saw a need to improve the quality of online learning through

effective learning strategies, helpful quizzes to improve student understanding, task reminders, and enough time for students to complete assignments (Saleh, Sari, and Alim 2021).

Universities in Indonesia tended to respond independently to the COVID-19 pandemic, through issued policy guidelines for teaching and learning activities, education services, remote examinations, extension of the study period and the online tuition period, and online lectures and practicums (Nursjanti et al. 2021). However, they had to obtain permits for face-to-face classes or offline campus activities (e.g., laboratory and field lecture activities) from the local government or its agency. The permits came with strict protocols for health under the Joint Decree of the Minister of Health, the Minister of Education and Culture, the Minister of Home Affairs, and the Minister of Religion Regarding Guidelines for the Implementation of Learning in the New Academic Year in the 2019 COVID-19 Pandemic Period (Nursjanti et al. 2021).

One study on students in Indonesia suggested several educational strategies for improving online learning: (i) drafting emergency preparedness plans, (ii) delivering content in smaller units, (iii) emphasizing the use of the teacher's voice in online teaching, (iv) working with teaching assistants and getting online help from them, (v) strengthening students' ability to learn outside the classroom without excessive instructor control, and (vi) efficiently combining online and offline self-learning while communicating adequately with students on their work and their learning progress (Rahiem 2020).

Several studies reported challenges to emergent online learning in HEIs, including poor internet connectivity, limited information and communication technology (ICT) skills, a lack of teacher incentives, insufficient time for online interaction, limited access to devices, low level of university readiness for online teaching and learning, and a lack of support for minority students (e.g., students with disabilities or from non literate families) (Fajri et al. 2021; Garad, Al-Ansi, and Qamari 2021; Nugroho et al. 2021; Nursjanti, Amaliawiati, and Nurani 2021).

Nepal

The first case of COVID-19 in Nepal was reported in January 2020, and the government required schools to shut down on 19 March 2020. However, classes did not immediately move online. The country had too little experience in distance learning, none of the HEIs—except one distance-mode university—had the necessary infrastructure and were unprepared for the shift. Tribhuvan University—Nepal's largest and oldest university, with about 85% of its university student enrollment and 8,000 instructors—was the first in the country to hold online classes for its students. Other HEIs soon started going online as well (Gautam and Gautam 2021).

Higher education in Nepal is provided by 11 universities and 4 medical academies. In the school year 2019/2020, the country's 1,425 HEI campuses had a total enrollment of 466,828 (University Grants Commission, Nepal, 2021a).

The development of online learning in the country has accelerated since 2000. That year, Nepal joined the South Asian Association for Regional Cooperation Consortium of Open and Distance Learning (Jha 2020). Despite high expectations, policies and documentation to support schools in developing online learning platforms and courses took effect only in 2007 and the first distance-mode university opened only in 2015. Universities in Nepal have a long history of distance learning using non-online technology such as radio broadcasting since the late 1950s.

The implementation of online learning in Nepal's HEIs was led by Tribhuvan University and Kathmandu University, another leading university and the country's third oldest. Both universities first offered open and distance learning classes through radio. Tribhuvan University is recognized for its contribution to the nationwide dissemination of online learning. Its Open and Distance Education Centre provides programs such as e-library, virtual classes, promotion of access and equity in higher education, training in e-learning for education

professionals, and the development and use of an economically viable learning management system (LMS) for open and distance learning (Pangeni 2016).

The government began running programs such as the Nurturing Excellence in Higher Education Program to support universities. This program was intended to strengthen the market relevance and quality of higher education, boost collaborative research and innovation, and improve equitable access for underprivileged groups during the crisis. The World Bank agreed to fund $60 million for this project (World Bank 2020; University Grants Commission, Nepal, 2021b).

About half a million university students were reported to have been deprived of education early in the lockdown. In April 2020—a month after schools closed—the Ministry of Education, Science and Technology invested about $600,000 to start preparing for online education. A team of experts was formed to draw up plans for online instruction at academic institutions (Ghimire 2020b).

In previous research on student-preferred learning methods in schools where online learning was less prevalent before the pandemic, two-thirds of students reported that their experience with online learning during the pandemic did not compare favorably with traditional classroom learning; 77.8% stated that they would continue to choose face-to-face learning in the future (Nepal et al. 2021). This preference for, and familiarity with, the traditional method could explain some of the difficulties found in online learning (Pangeni 2016).

A study from a specific region in Nepal found that less than 10% of school-age students have access to the internet or adequate coverage to participate in remote classes at home (Ghimire 2020a). Only 56% of the whole population has access to the internet, while 8% of families have access to electronic devices (Pandit 2020). Most of the access to the internet is provided through mobile data; only 12% of the population has access through broadband connections (Ghimire 2020a).

The cost of mobile internet data in Nepal is about Rs 100 per gigabyte (GB), higher than the cost in nearby countries (MyRepública 2020). Nepalese telecommunications companies launched mobile data packages to help financially strapped university students. Ncell, for instance, made its Mobile Class Data Pack available to university students taking online classes at Tribhuvan University. The data plan offered 16 GB connectivity for only Rs 150 and included 10 GB for the exclusive use of Microsoft Teams for online classes.

Hybrid learning in Nepal higher education is not mainstream but is taken into account in Kathmandu, Purwanchal, Tribhuvan, and other universities. Kathmandu University's master's and doctoral degree programs in certain areas of study (such as business or education) were accessible online or in hybrid mode (KU Online 2021).

During the pandemic, some positive attempts were made to use online teaching strategies and introduce innovative e-learning techniques. Universities gave priority to several platforms (e.g., Zoom, Google Meet, Microsoft Teams, Viber, WhatsApp) in running activities online. At Tribhuvan University, the Microsoft Teams platform was provided for 500,000 users, students as well as teachers (Nepo Result 2020).

Massive open online courses (MOOCs) were accessible through well-known international platforms in Nepal. However, according to reports, course completion rates were not noticeably high. Along with international MOOCs, the Government of Nepal has allowed some foreign open universities (e.g., Indira Gandhi National Open College) to offer doctoral programs in executive leadership in Nepal (Jha 2020).

One of the biggest challenges of promoting online learning in Nepal was finding the proper assessment tool for online classes (Acharya et al. 2021). Although most classes in the country's universities were delivered through distance learning, schools had not been able to implement an online examination system. Students, required to take exams to finish their courses, had no choice but to take them in person. In August 2021, students launched a campaign to stop in-person exams without proof of vaccination (Ghimire 2021).

Nepal's topography features many high mountains that tend to widen gaps in access to online learning classes. Students living at high altitudes reportedly faced more severe difficulties with poor network coverage in their region (Chaudhary et al, 2022). In addition, many research studies from international institutions pointed out disruptions in gender equality in higher education in Nepal during COVID-19 (Luna 2020, UN Women 2020). Disengagement and disconnection are likewise seen as serious barriers to successful learning for some culturally, socially, and economically marginalized students (e.g., Dalits women) in Nepal's higher education settings (Devkota 2021).

Pakistan

As soon as the first case of COVID-19 was found in February 2020, the Government of Pakistan suspended all school classes. Schools up to the secondary level had to postpone all academic activities and exams because of this decision, but HEIs were declared exceptions. The country's Higher Education Commission (HEC) announced that universities should continue their classes and exams online. They were also allowed to postpone classes until the end of May to prepare online courses (*Pakistan Today* 2020). To support the universities, the HEC formed a COVID-19 technology support committee and provided universities with guidelines for online courses to prevent learning loss.

Pakistan had 211 universities, public as well as private, in 2018–2019. Their total enrollment during the period was 1.86 million (Government of Pakistan 2021).

The latest Pakistan Higher Education Commission Vision 2025—released in 2017 before the COVID-19 outbreak—contained plans to establish more online programs and improve ICT infrastructure. The need to support the provision and availability of digital materials and services was also covered (Universities UK International 2017). With the advent of the pandemic, the government accelerated efforts to promote online learning and ICT infrastructure.

In April 2020, the HEC asked each university to establish or designate an online accreditation committee to authorize the online delivery of courses and settle disputes or disagreements that arose during operation (Government of Pakistan, HEC 2020a). The Vice Chancellors' Committee also showed its commitment to follow the HEC's overall plans for improving the online readiness of their schools (Government of Pakistan, HEC 2020b).

The Government of Pakistan collaborates with international organizations in implementing projects to promote online learning nationwide. The Higher Education Development in Pakistan project in 2019, for instance, was aimed at strengthening governance, teaching, and learning in Pakistan's universities, including setting up ICT institutions and services, with $400,000 in World Bank funding (World Bank 2021).

The HEC required schools to provide LMS platforms for online learning (Government of Pakistan, HEC 2020b). Private providers helped make such platforms available. Google Meet, Google Classroom, Zoom, and YouTube were widely used during the pandemic (Mukhtar et al. 2020).

Concerning MOOC programs, Coursera worked with the HEC and the Punjab Skills Development Fund to strengthen the national education system (Lands and Pasha 2021). In September 2021, the HEC announced that it would collaborate with Coursera in providing free access to international online courses. Under the HEC's Digital Learning and Skills Enrichment Initiative, students, faculty members, and alumni of public universities can register for Coursera courses for free (Government of Pakistan, HEC 2021).

As in other DMCs, internet connectivity is a problem for students and teachers in Pakistan; one that, in their view, merits priority attention to improve the quality of e-learning. One study showed that unstable connectivity is the

greatest barrier encountered by the country's students: 89.8% of the student respondents said that this problem could lead to learning disruptions (Qamar and Bawany 2021). This matter was also reported in various earlier studies (Ali et al. 2011, Sarwar et al. 2020).

The HEC and the telecommunications industry joined together to deal with the pressing concerns of students unable to pay for internet access for online learning. As the students mostly use smartphones for class, the "Taleem Bundle," a lower-cost internet package for students (50 GB, at about Rs 600) was made available (Ufone n.d.).

In a study of the overall satisfaction of Pakistani undergraduate dentistry students with online classes during the pandemic, respondents showed high dissatisfaction with the level of information conveyed through online learning compared with on-campus classes. These complaints also had close links to teachers' unpreparedness for online classes (Sarwar et al. 2020).

Philippines

In 2020, the Philippines, with a population of 109,035,343, had 2,981,803 university students and 2,396 universities, consisting of 533 state universities and colleges and satellite campuses, 121 local colleges and universities, 1,729 private HEIs, and 13 other government schools (such as those offering professional training or vocational education, or special chartered public HEIs) (Government of the Philippines, Commission on Higher Education 2020b; Kim 2020; Philippine Statistics Authority 2021). Since the pandemic began and Presidential Proclamation No. 929 was issued on 16 March 2020 placing the entire country under a state of calamity and imposing strict quarantine throughout Luzon, the Philippines was one of five countries in the world that had not restarted in-person classes by May 2022, affecting the right to learn of more than 27 million Filipino students (Avila and Cabrera 2020, Palatino 2021, UNICEF 2021).[1]

To meet the needs of learners—especially the 3.5 million tertiary-level students enrolled in about 2,400 HEIs—policies for the continuance of education were implemented by some HEIs despite the closure. Among the matters covered were modified forms of online learning, especially in top universities such as De La Salle University, Ateneo de Manila University, University of Santo Tomas, and the state-run University of the Philippines Diliman (UPD) (Joaquin, Biana, and Dacela 2020). The government's emphasis on continuous learning despite the pandemic was clear. Former Department of Education (DepEd) Secretary (under the Duterte administration) Leonor Briones declared, "Education must continue even in times of crisis whether it may be a calamity, disaster, emergency, quarantine, or even war" (Government of the Philippines, DepEd 2020; Joaquin, Biana, and Dacela 2020). The Commission on Higher Education (CHED), for its part, advised HEIs to continue the "deployment of available flexible learning and other alternative modes of delivery instead of in-campus learning" (Joaquin, Biana, and Dacela 2020).

The Philippines does not have a national policy dealing directly with online platforms such as MOOCs, open and distance e-learning, and open educational resources (OERs). While laws like the Open Distance Learning Act provide a legal basis for funding such platforms, these are not enough. "Some national policies must be put in place to sustain the growth" of these online platforms (Joaquin, Biana, and Dacela 2020).

In 2020, under the Bayanihan Act 2 (Republic Act No. 11494), the government allocated ₱3 billion (about $60 million) for the digital transformation of state universities and colleges and the development of smart campuses through investments in ICT infrastructure, and the acquisition of LMSs and other equipment needed for flexible learning delivery (Chao 2021). The CHED issued recommendations for the adoption of flexible learning and teaching, defining this method based on the Southeast Asian Ministers of Education Organization's

[1] The Department of Education, on 30 May 2022, announced the resumption of in-person classes in August.

pedagogical approach. It also urged HEIs to deploy versatile curricula and other forms of distribution in place of on-campus instruction (Gocotano et al. 2021). The DepEd distance learning approach uses three methods of delivery: (i) printed modules distributed to students; (ii) access to DepEd Commons, an online education platform developed by the DepEd to support alternative modes of learning; and (iii) lessons or self-learning modules available via radio and television (Joaquin, Biana, and Dacela 2020).

According to the 2019 National ICT Household Survey (Government of the Philippines, Department of Information and Communications Technology 2019), about 82.7% of Filipino households had television, but only about 17.7% had access to the internet at home. Only 8.2% of households had their own fixed telephone line, and about 23.8% had shared computers. One study showed that one out of five medical students did not have a computer, and roughly one out of 20 used only a smartphone for internet access (Baticulon et al. 2021).

A survey done by professionals who have been teaching various courses in HEIs in the Philippines revealed the extensive use of Facebook Messenger, Google Classroom, and Edmodo (Reyes-Chua et al. 2020). Other e-learning platforms in common use are Zoom, Moodle, WeChat, Schoology, and Google Meet. Most of the professor respondents said that Facebook Messenger is one of the most convenient modes of alternative learning, especially for students who cannot afford a Wi-Fi connection. If the students have free data, they can easily see their professors' instructions, including the tasks assigned to them. Google Classroom, also one of the best platforms, can be accessed for free by institutions or faculty members. But while these e-learning platforms can be used without charge, the low availability of hardware resources could explain why students or teachers were not able to use these platforms fully. Teachers and students should nonetheless be glad that these e-learning platforms were freely accessible, as they made academic life easier, most especially during this pandemic (Reyes-Chua et al. 2020).

The average time spent on the internet daily is highest in the Philippines among countries in Asia and the Pacific. Of the total population of 109 million in 2020, 79.66 million (about 73%) were internet users and 75.96 million (70%) had Facebook accounts. In addition, 79.05 million (72%) used smartphones (Statista 2022a). However, according to several studies (Baticulon et al. 2021; Chao 2021; Reyes-Chua et al. 2020; Joaquin, Biana, and Dacela 2020), the availability of a fast and reliable internet connection is a bigger concern than either device ownership or technical aptitude.

Instructors and students used Facebook to communicate and share instructional materials. Many students lacked the resources to secure laptops or other types of computers for their use at home, and without online access, the mobile messaging app Facebook Messenger was an alternative learning platform. Their access needs were met, and the students were encouraged to participate. Weak internet connection was evident in all cases, and student–teacher and student–student interaction was poor and ineffective. The professors tried to understand the situation and give the students time to read the uploaded materials (Reyes-Chua et al. 2020).

Amid the infrastructure and institutional capacity challenges in most HEIs, students were participating in "flexible learning," which combined online and offline programs. The learning curve was short, and most professors, students, and researchers had to adapt to the hybrid reality of digital and on-campus activities and the more online research environment (Chao 2021).

Among the major issues raised in one survey (Reyes-Chua et al. 2020) was the insufficient training of teachers and students in using the e-learning classroom. The CHED has been conducting capacity-building activities (particularly in ICT skills and competencies and the use of educational technology), in collaboration with other agencies and universities, and established PHL CHED Connect to promote and provide access to higher education course materials for teaching, learning, and research (Chao 2021; Government of the Philippines, CHED 2020). But the HEIs themselves were to conduct thorough training and workshops for all their students and teachers, in various platforms appropriate to their academic needs, and prepare the HEIs to respond to the learning challenges during the pandemic.

Many studies have suggested educational strategies to improve online learning by (i) making computers with an internet connection and adequate software more accessible; (ii) developing basic computer and digital skills such as saving files, creating folders, and using search engines; and (iii) providing teachers and students with the necessary technological competence and capabilities through training (Baticulon et al. 2021; Chao 2021; Reyes-Chua et al. 2020; Clemen et al. 2021; Gocotano et al. 2021; Joaquin, Biana, and Dacela 2020; Rotas and Cahapay 2020).

In the Philippine context, the digital divide among students is critical. Different sectors criticized the online learning measures implemented by some HEIs. For example, through an online petition based on student and teacher sentiments, student governments from different universities urged the CHED to mandate the cancellation of online classes, stating that "while we understand the need for learning to continue, the different circumstances of students across universities are not ideal and conducive [to] such." The petitioners argued that "access to the internet connection and learning devices continued to be a privilege up to this day, placing those with poor internet access at a disadvantage when it comes to online classes." The internet is inaccessible to 46 million Filipino citizens (45% of the total) and 34,500 public schools (74%) (Joaquin, Biana, and Dacela 2020; Rotas and Cahapay 2020).

With those petitions in mind, the state-run UPD suspended all modes of online learning on 17 March 2020. In his message to the academic community on that day, UPD Chancellor Fidel Nemenzo said the suspension was because of (i) emergency concerns, as "caring for our families and for ourselves comes first"; (ii) "unequal access to personal computers and the internet … among our community"; and (iii) "the [far-from-smooth] shift to online classes … for our faculty, who have had to learn new skills and revise their syllabi overnight" (Joaquin, Biana, and Dacela 2020).

A heavier workload for students also increased their burden and ran counter to the purpose of the lockdown, which was to help their families prepare for and adjust to the present situation. Finally, there were the issues of an unconducive learning environment at home and questions about the effectiveness of online lectures. Social media hashtags like #NoStudentLeftBehind, #NoSchoolLeftBehind, #EndOnlineClasses, #EndTheSem, and #NoToOnlineClasses added fuel to these sentiments (Joaquin, Biana, and Dacela 2020).

The situation in remote learning could worsen inequalities and translate into barriers to online learning (Rotas and Cahapay 2020).

Republic of Korea

Of the country's population of 51.3 million in 2021, 1.9 million were enrolled in universities (Korean Educational Development Institute 2021). But 165 of the 193 universities (85.9%) had closed their campuses and launched online classes (Lee 2020) after the first case of COVID-19 was found in January 2020.

The Ministry of Education (MOE) announced its COVID-19 Infection Prevention and Management Guidelines for Universities in March 2020. The MOE updated the guidelines twice, in May and August 2021 (Government of the Republic of Korea, MOE 2021a, 2021b). The guidelines covered (i) the management and operation of classes, facilities, and services; (ii) governance, leadership, and communication; (iii) testing and quarantine rules; (iv) emergency management; and (v) documentation. One of the most notable changes made after COVID-19 emergence was in distance learning regulations. Before COVID-19, the MOE had allowed HEIs to run only up to 20% of their classes online; now, all their degree programs, undergraduate as well as graduate, could be offered online. The MOE, in its Recommendation on University Management for the Spring Semester of 2020, issued earlier, expressed its temporary acceptance of fully online courses. The MOE urged HEIs to refrain from running on-campus classes and to take policy actions in support of online learning. Specific circumstances that

instructors and students could face, such as tasks and difficulties in online assessments, and the use of online tools in class management, were mentioned.

During this period, the MOE gave the HEIs autonomy in deciding how to run their classes. Classroom management became more flexible and responsive to the views of teachers and students. In addition, under the Standards for the Operation of Remote Classes at Universities in the First Semester of 2020, HEIs could organize and hold remote classes on their own (Government of the Republic of Korea, MOE 2020b).

As students and teachers were adapting rapidly to the new class format amid the pandemic, the MOE and the HEIs saw an opportunity to accelerate the spread of remote learning for the spatial renovation of traditional universities.

In lifting its restrictions on online classes, the MOE portrayed this transformation as the new normal in the post-COVID era. It announced the Supporting Digital Innovation in Higher Education program in September 2020 (Government of the Republic of Korea, MOE 2020a), and issued the Instruction on the Operation of Remote Classes at General Universities (Instruction 367) in February 2021 as an extension of this program (Government of the Republic of Korea, MOE 2021c). HEIs, under their systems, were able to determine detailed protocols. Now they had to take on certain responsibilities in holding online classes. These responsibilities included complying with standards for the following, among others: (i) classifying and opening remote learning courses; (ii) operating remote classes, defining completion levels, determining and awarding credits for completion, and evaluating student performance; (iii) managing school attendance, closure, and sectioning; (iv) using and acknowledging external content; (v) creating management committees for remote classes; (vi) establishing a support center for remote classes; and (vii) protecting personal information. The MOE also set aside a higher budget of W100 billion to assist 237 HEIs in enhancing the quality of their online classes.

The Ministry of Science and Information and Communication Technology, for its part, provided mobile communication fee subsidies to students aged 16–34 and over 65, to support online learning during COVID-19.

A survey revealed that the platforms most commonly used in online classes in the Republic of Korea were primary school provision systems (used by 65% of survey respondents), followed by Zoom (44.0%) and YouTube (27.0%) (Biological Research Information Center 2020). Primary school provision systems and Zoom received favorable ratings from about 30.0% of the student respondents.

In a survey of 206 students who took remote classes in the first semester of 2020, 82.0% of respondents used laptops for remote classes. Smartphone users made up 7.0%, and desktop users, 6.0% (Lee and Kim 2020). Another study also showed considerable laptop use (by 77% of respondents) for remote learning, followed far behind by desktop (12.5%) and smartphone use (10.4%)(Lee and Shin 2020).

One study referred to the wide use of Everytime—an online community of university students—among students (Kim 2020). Seventy percent of student respondents mentioned Insta Pay as a preferred textbook purchasing app, and 36.0% said they used K-MOOC for online learning. K-MOOC was singled out for the access it provided to lectures from other universities. Another study showed that teachers were more disposed to provide asynchronous, rather than synchronous, online learning (44.8% versus 31.5%)(Lee and Shin 2020). Students participating in synchronous online education mostly used Zoom or Google Meet.

Dashboards in most university LMS or online learning systems are used mainly for student–teacher communication (Jin and Shin 2020). The HEIs also make effective use of social networking systems and popular mobile messaging apps. Research indicates that the mobile messaging apps used most often in the Republic of Korea are Facebook and KakaoTalk (Statista 2022b).

In 2019, 82% of the world's population had access to high-speed internet (OECD 2020). Other statistics revealed an internet penetration rate of 96.16% in the Republic of Korea in 2021 (Statista 2022b). The country's fiber-optic internet penetration rate in 2021 was 1.5 times higher than the OECD average of about 30%. More than 85% of the population in 2021 had wired broadband internet subscriptions above 100 megabits per second. The average fee of about $40 for Gigabit internet in the country was the fifth cheapest among 38 OECD member countries. The average monthly use of mobile communication data without Wi-Fi per user was only 7 GB, ranking 11th in the OECD. This low figure was attributed to the wide sharing of Wi-Fi connections in homes and offices (OECD 2020).

Efforts were made in many HEIs to transition to hybrid learning. Konkuk University, for example, held hybrid classes using e-learning systems, VRstudios, and OpenLearning. Hanyang University's Hy-Live is a model of online learning using 5G telepresence videoconferencing technology. This makes field practicum based on virtual reality applicable. The use of metaverse platforms to expand the school campus is also spreading rapidly among HEIs, including the University of Ulsan, which developed an online campus, Gather Town, using metaverse.

Many universities offered capacity-building programs for instructors to strengthen teaching competencies in the new environment. The programs provided guides on the use of Zoom, device (such as laptops or tablets) support, and workshops in online learning pedagogy and innovative teaching methods. Hosted mostly by the schools themselves, these programs varied depending on the school environment and capabilities.

Studies of higher education during the pandemic have suggested several strategies for improving remote classes: (i) establishing a stable web server; (ii) designing and implementing accountable LMSs; (iii) standardizing remote teaching methods and operations; (iv) enhancing teacher capacity for remote teaching (e.g., by developing pedagogy for online teaching); (v) improving the quality of remote classes by building better learning communities; and (vi) ensuring flexible communication between teachers and students (Cho 2020, Y. H. Kim 2020, Lee and Kim 2020, Lee and Shin 2020).

Increasing demand for a refund of tuition fees from student bodies—arguing that low-quality, unprepared online classes had disrupted education—sparked considerable debate. The demand was deemed reasonable, especially by students in disciplines requiring field practicum and laboratory courses. In a survey of 21,784 students, 99.2% said that universities should refund tuition fees. Some universities compromised by offering a partial refund or handing out "special scholarships" to students. Others followed, but some did not, pointing out that pandemic-related crisis management and online classes were costly. The high dependence of most schools on foreign company software use raised their costs (Cho 2020).

Viet Nam

Since the first case of COVID-19 in Viet Nam was reported on 23 January 2020, the government relied on non-pharmaceutical interventions, including school closures. The Ministry of Education and Training (MOET), on 2 February 2020, announced that provinces affected by COVID-19 could decide on localized closures of schools and neighborhoods. As a result, lower and higher secondary schools were closed nationwide until 4 May 2020 (UNICEF 2020, WHO 2020). Although policies have changed since then—some schools have reopened, while others have stayed closed—schools continue to provide online teaching and learning. Since 19 September 2021, students in 25 provinces in the northern mountain region and the Song Hong (Red River) Delta have returned to their classrooms, 13 other provinces have been applying semi-virtual teaching and learning methods, and the remaining 25 provinces have stuck to online teaching and learning (WHO 2021). More than 21 million students have been affected by school closures (H. T. T. Nguyen et al. 2020, Q. D. Nguyen 2021). As of June 2021, Viet Nam's HEIs consisted of 172 public and 65 non public universities (Government of Viet Nam, General Statistics Office 2021). Because of the pandemic, a high percentage of students—including 58.8% of those from undergraduate or vocational programs and 39.1% of postgraduate students—had to study online. Only one-third of the country's students had experienced online learning before the COVID-19 outbreak (Maheshwari 2021).

Viet Nam made progress in higher education, and the MOET has played a role in initiating positive change toward modern governance by amending the Law on Higher Education (No. 08/2012/QH13) in 2018 and implementing the university autonomy agenda since 2014 (Parajuli et al. 2020). After the outbreak of COVID-19, the MOET decided to implement e-learning across schools and universities nationwide from 26 March 2020, stipulating that it was "suspending school, not stopping learning" (Government of Viet Nam, MOET 2020). Although most HEIs were not well prepared for the implementation of e-learning during COVID-19 because of the limited technology infrastructure and official process, poor e-learning materials, and the lack of necessary skills for online learning, 110 of Viet Nam's 240 HEIs shifted from traditional face-to-face classes to distance education. Of these 110 HEIs, 70% were privately owned (Ho et al. 2021, Pham and Ho 2020).

The National Agency for Scientific and Technological Information under the MOET signed a strategic agreement (2019–2025) with the Vietnam Posts and Telecommunications Group (VNPT) to introduce and expand new education methods for the Fourth Industrial Revolution (VTN News 2020). The unexpected delay in school opening compelled some private schools and HEIs to come up with ways to help students study at home, including the use of video-streamed lectures, recorded lectures, classes via video chat, and shared practice homework, through the internet. The government, fully aware of the situation, also began distributing free e-learning solutions to schools in Ha Noi through VNPT on 4 February 2020. Fourteen television channels broadcast general education lectures, and 92 out of 240 universities adopted online learning. The MOET's 5,000 e-learning lectures in general education were being put to use for free (Government of Viet Nam, MOET 2020).

The MOET issued several official documents: (i) No. 795/BGDDT-GDDH (13 March 2020), to encourage HEIs to deliver traditional face-to-face courses fully online; (ii) No. 998/BGDDT-GDDT (13 March 2020), to guide HEIs in ensuring the quality of distance education during the COVID-19 pandemic; and (iii) No. 1061/BGDDT-GDTrH (25 March 2020), to provide guidelines for teaching via the internet and on television (Government of Viet Nam, MOET 2020; Nguyen and Pham 2020; Pham and Ho 2020). All distance learning and teaching during the pandemic was provided free of charge by the government (Government of Viet Nam, MOET 2020).

Entities under the Ministry of Information and Communications supported free data access for students and teachers for distance education and training programs (Government of Viet Nam, MOET 2020). Telecommunications provider VNPT offered free internet for more than 43,000 schools, free support for the use of training and education management solutions in those schools, free server rental, and bandwidth for university distance learning (Pham and Ho 2020; Government of Viet Nam, MOET 2020).

The proportion of students using laptops (85%) or other electronic gadgets such as tablets (45%), smartphones (37%), and e-readers (31%), as the most important device for their academic success, was significantly increasing every year. Sixty-seven percent of student smartphones and tablets were being used for academic purposes in higher education (Nguyen and Hoang 2020). In 2020, there were 61.3 million smartphones in use in Viet Nam, and the country was among the top 10 countries in smartphone use and penetration (Government of Viet Nam, Ministry of Information and Communications 2021).

The three mainstreaming platforms used for online learning in Viet Nam are Zoom, Microsoft Teams, and Google Meet (Maheshwari 2021). The top social media app among internet users is Facebook, and the social media platform most used by millennials for connecting with friends and family is Zalo. YouTube is the leading platform for video streaming among internet users (Statista 2021).

Of Viet Nam's population of 97 million in 2020, 69.24 million were internet users. Internet penetration in this country is 72.9%, and mobile internet penetration is 69.0%. The average internet speed is 9.5 megabits per second. For internet access, the fixed-broadband basket is priced at $7.30 a month; the mobile-cellular basket at $5.33 (Q. D. Nguyen 2021). Universities in the country, especially those in the Mekong Delta, are in the city centers, and students returning to their hometowns were unable to enjoy an equally favorable learning

environment. All in all, learning from a distance through the internet presents a major challenge for those living in the countryside and in disadvantaged conditions (Van and Thi 2021).

HEIs in Viet Nam actively adapted to online learning. Videoconferencing tools (VCTs), including Zoom, Microsoft Teams, Google Classroom, and Facebook Groups, were widely used in those institutions during COVID-19 to respond effectively to the distance learning requirements (Pho et al. 2020). Despite the support available for internet and laptop use, some vulnerable students living in mountain, rural, coastal, and other remote areas remained unable to cope with the rapid changes. Some traditional distance learning techniques, such as sending study materials to the students' home addresses, were therefore applied. At the same time, teachers created online chat groups using tools like Zalo and Facebook, to answer student questions or to discuss assignments (Pham and Ho 2020). HEIs that had applied online teaching can be divided into two groups: those with an LMS and those without an LMS. HEIs without an LMS used real-time online teaching support tools (live video communication) and communication tools (Google Hangouts, Microsoft Teams, Adobe Connect, Zoom, Skype, email, and social networks) for teacher–student communication.

Although the technology used in distance learning followed the e-learning model at the start, the transformation of the learning experience from real to virtual learning created blended learning environments in some modules. Most HEIs in Viet Nam began applying these blended learning modules at the individual activity level, providing online lectures and e-books for learning, instead of traditional print textbooks. In some places, teachers took advantage of LMS facilities to perform combined teaching at the course level, for instance, in task transfer learning and online learning assessment (Tang and Tien 2020). One survey showed that teachers' activities in blended lessons—including learning material provision, technology implementation, teaching and assessment, and student support—were all considered valuable (Le and Pham 2021). Moreover, student overall satisfaction with blended learning was quite high. Blended learning is effective in teacher training courses in Vietnamese higher education mainly because of the balance maintained between online and face-to-face components and between student–teacher and student–student interaction. Most students in Viet Nam still prefer to learn in person (Van and Thi 2021).

Online training workshops were held to prepare teachers for online classes. The topics covered include Microsoft Teams, Google Classroom, and other platforms. Senior instructors who were not proficient in modern technological advances received private guidance at home. Remote training in the use of these new tools was also given to students (Pham and Ho 2020).

During the COVID-19 pandemic, many Vietnamese HEIs offered special policies for students, such as tuition fee reductions, support for the purchase of laptops, and access to broadband internet (Q. D. Nguyen 2021, Pham and Ho 2020).

One study suggested that (i) most higher education courses should integrate both distance learning and classroom learning; (ii) HEIs should establish a set of quality standards for online tests, examinations, and student participation; and (iii) the government should extend financial and academic support to HEIs that had not yet begun e-learning during the pandemic (Pham and Ho 2020). Another study proposed (i) assigning the preparation of online teaching materials to professional designers while also providing instructors or teachers with pedagogical training in this method and (ii) giving students enough time to familiarize themselves with the new programs (Q. D. Nguyen 2021).

Since the late 1990s, distance learning in Viet Nam has involved DVD/VCD use rather than e-learning delivered mainly via online courseware. Only 2% (33,638) of the country's 1,581,227 higher education students have participated in distance learning since 2016. There are several reasons for this: (i) social conservatism, mainly in government; (ii) negative attitudes toward distance learning; (iii) the absence of intrinsic motivation in universities to use educational technology in their daily activities; and (iv) the lack of government policy support to encourage universities to integrate modern educational technology elements into their regular courses (Ho et al. 2021, Pham and Ho 2020).

Conclusion

This section of the report reviewed literature regarding emergent online learning during the COVID-19 pandemic in higher education in six DMCs (Indonesia, Nepal, Pakistan, the Philippines, the Republic of Korea, and Viet Nam).

When the COVID-19 campus shutdown kept schools from holding in-person classes, the DMCs responded by building basic online learning environments. They made funds available to facilitate internet access, built and improved online learning platforms, provided legal bases and policies for related services, and collaborated with international aid agencies and other countries.

Just before COVID-19, universities in the DMCs seemed inclined to tolerate online learning (e.g., MOOCs or OERs). But insufficient internet infrastructure and a lack of learning–teaching experience hampered the transition. Helping students and teachers with stable internet connections and digital learning tools (e.g., Zoom, Webex, Microsoft Teams, and Google Meet) became the primary task of governments. Designing pedagogical skills for online learning followed next. Despite these government efforts, however, poor internet connectivity, limited capabilities for online learning, and the digital divide continued to present challenges.

Universities were found to use both their platform and globalized platforms to support online learning. The governments organized and operated related national committees and leveraged relief funds to improve online access and data plans. They aimed to ensure that teachers and students would not be deprived of opportunities to sustain the teaching–learning process online.

Nevertheless, with the pandemic persisting, weak internet connections and inadequate data packages, less-than-satisfactory learning content, and low teacher and student competency for online learning remain complex issues that continue to confront higher education in the DMCs.

Universities and governments in the DMCs expected to deal with arduous transactions even after the pandemic ended and campuses reopened. Their higher education policies regarding online and distance learning show their intent not only to respond to the pandemic but also to prepare for the future. The management of in-person classes, as well as academic workload, exchange programs, credentials, resource-sharing, and overall infrastructure, is likely to change.

III. Diagnostic Analysis

Indonesia

Demographic Information

Higher education institution background information. Most of the Indonesian student respondents (92.2%) were enrolled in private HEIs; most (81.7%) were enrolled full-time. More than 80.0% of HEIs surveyed at each respondent level were in the urban areas. Among the HEI administrator respondents, 36.6% had fewer than 1,000 students enrolled in their undergraduate programs. Rectors made up the highest number of HEI administrators (95.4%) and the teacher respondents were mostly lecturers (75.2%) (Table 2).

Table 2: Higher Education Institution Background Information (All Responses)—Indonesia

	HEI Administrators		Faculty		Students	
Item	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Public or private HEI						
Public	6.4	1,584	6.1	3,547	7.8	36,579
Private	93.6	1,584	93.9	3,547	92.2	36,579
HEI location						
Urban	86.0	1,584	84.9	3,547	80.6	36,253
Rural	11.7	1,584	13.2	3,547	15.7	36,253
Estate	2.3	1,584	1.8	3,547	3.7	36,253
How many students are enrolled in undergraduate programs?						
Fewer than 1,000	36.6	1,584				
1,000–2,499	24.3	1,584				
2,500–4,999	15.2	1,584				
5,000–9,999	10.5	1,584				
10,000–19,999	8.3	1,584				
20,000 or more	5.1	1,584				
Current position						
Rector	95.4	1,584				
Vice-chancellor	0.3	1,584				
Dean	0.3	1,584				
Department/Faculty chair or head registrar	0.6	1,584				
Professor			1.3	3,547		
Associate professor			1.3	3,547		
Assistant professor			5.3	3,547		
Senior lecturer			14.5	3,547		
Lecturer			75.2	3,547		
Full-time student					81.7	36,579
Other	3.4	1,584	2.4	3,547		

HEI = higher education institution.

Student background information. The student respondents were predominantly female (69.8%). Ninety-nine percent were domestic students. Most of the students (56.1%) were from urban areas; 36.9% were staying near the HEIs; and 77.8% were living with family members (relatives). Families or guardians supported the tuition fees and living expenses of most of the students (72.5%). Concerning socioeconomic status, the largest number of student respondents (39.1%) placed themselves in the lower-middle-class category (levels 4 and 5). Household income for the highest number (27.5%) came mainly from salaries and wages (employment in the private sector). The fathers (36%) and mothers (38.8%) of the students had had at least some secondary education (Table 3).

Table 3: Student Background Information—Indonesia

Item	Students	
	Yes (%)	Responses (no.)
Gender		
Male	30.2	34,294
Female	69.8	34,294
Nationality		
Domestic	99.0	34,294
Foreign	1.0	34,294
Current residence location		
Urban	56.1	34,294
Rural	6.4	34,294
Estate	37.5	34,294
Boarding near the HEI	36.9	34,294
Housing status		
Student dormitory (on-campus)	2.9	34,294
With family members (relatives)	77.8	34,294
Independent	19.3	34,294
Main source of funding for tuition fees and cost of living		
Scholarship (waived tuition fee)	13.6	34,294
Self-financed (by the family or guardian)	72.5	34,294
Self-financed (by the student)	12.6	34,294
Student loan	0.2	34,294
Other	1.1	34,294
Self-evaluated socioeconomic status		
Low (levels 1–3)	10.1	34,203
Lower-middle (levels 4 and 5)	39.1	34,203
Upper-middle (levels 6 and 7)	33.8	34,203
High (levels 8–10)	17.0	34,203
Main source of household income		
Salaries and wages (government employment)	15.6	34,294
Salaries and wages (private sector employment)	27.5	34,294
Salaries and wages (foreign employment)	1.0	34,294
Self-employment income (running own business)	18.2	34,294
Self-employment income (farming)	16.8	34,294
Self-employment income (casual work)	11.2	34,294
Charity (donations from relatives)	0.6	34,294
Pensions	3.0	34,294
Net property income (interest and other investment income received)	0.2	34,294
Other	5.8	34,294

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Table 3 *continued*

Item	Students	
	Yes (%)	Responses (no.)
Father's highest level of education		
At least some primary education	20.6	34,294
At least some secondary education	36.0	34,294
Completed technical and vocational education	14.5	34,294
At least some university/college education	26.6	34,294
Don't know / Not applicable	2.3	34,294
Mother's highest level of education		
At least some primary education	23.8	34,294
At least some secondary education	38.8	34,294
Completed technical and vocational education	12.5	34,294
At least some university/college education	23.7	34,294
Don't know / Not applicable	1.2	34,294

HEI = higher education institution.

Table 4: Remote Learning during the COVID-19 Pandemic (All Responses)—Indonesia

Item	Administrators		Faculty		Students	
	Yes (%)	No.	Yes (%)	No.	Yes (%)	No.
1. Remote learning provided to students	98.4	1,584	99.3	3,547	99.4	36,579
2. Delivery method for remote learning						
2.1 Mostly online learning	66.9	1,584	66.4	3,547	76.1	36,579
2.2 Mostly offline learning	0.7	1,584	1.4	3,547	0.9	36,579
2.3 Both online and offline learning	32.4	1,584	32.2	3,547	23.1	36,579

COVID-19 = coronavirus disease.

Internet and Technology Access

Remote education during the COVID-19 pandemic. More than 98% of HEIs in Indonesia provided remote learning during the COVID-19 pandemic (Table 4). Online learning was the delivery method most used by HEI administrators (66.9%) and teachers (66.4%). Some administrators (32.4%) and teachers (32.2%) used both online and offline learning. Among the students, most (76.1%) learned online.

Higher education institution support and promotion of remote education. Support services for remote teaching in HEIs most often took the form of (i) IT support teams (60.9%), (ii) multimedia content creation (video lectures) (55.5%), and (iii) online assessment creation (53.2%) (Table 5). On the other hand, no support for remote teaching was provided in 5.0% of HEIs.

About 80.0% of the administrator respondents reported that their HEI had a network operations center. Staffing levels at the centers ranged from 1 to 5 (46.9% of the centers) to more than 10 (22.6%); 20.5% of the centers had 6–10 IT staff members. For 6.1% of the administrators, however, their HEIs had no support team on campus.

Among the administrator respondents, 51.5% had an on-campus multimedia production studio in their HEIs to support remote teaching.

Table 5: Higher Education Institution Support for, and Promotion of, Remote Education (Administrator Responses)—Indonesia

Item	HEI Administrators	
	Yes (%)	No.
1. What are the most effective measures in support of remote teaching during COVID-19 in your HEI?		
Workshops in online training and skills	43.0	1,584
Guides to remote teaching	37.4	1,584
Incentives and benefits to motivating faculty to conduct remote teaching	36.3	1,584
IT tech support and troubleshooting services	65.9	1,584
Online introduction to a variety of updated information about remote teaching	60.8	1,584
Updating and use of the results of online course management and student achievement monitoring	42.9	1,584
Authority to use a single platform for online course management	27.4	1,584
Authority to use various online platforms for online course management	55.4	1,584
High-quality digital content and operation environment	38.2	1,584
Other	1.8	1,584
2. Which support services provided by your HEI during the COVID-19 pandemic are considered effective for students in remote learning?		
Workshops in online training and skills	35.5	1,584
Guides to remote learning	33.3	1,584
Education maintenance allowance (scholarships to prevent dropouts)	48.0	1,584
IT tech support and troubleshooting services	59.1	1,584
Online introduction to a variety of updated information about remote learning and online courses	57.2	1,584
Authority to use a single platform for online course management	26.6	1,584
Authority to use various online platforms for online course management	49.2	1,584
Student motivation to take online courses	47.0	1,584
IT gadget support for low-income students	30.6	1,584
Online mentoring support (e-mentoring)	43.8	1,584
Use and enhancement of online interaction functions	53.1	1,584
Other	2.0	1,584
3. Does your university/HEI have a network operations center?	78.4	1,584
4. If your university/HEI has an IT support team, how many staff members provide IT support?		
No IT support team	6.1	1,523
1–5 IT staff members	46.9	1,523
6–10	20.5	1,523
More than 10	22.6	1,523
5. Does your university/HEI provide teachers with support for remote teaching in the following areas?		
Professional development in remote teaching strategies	51.5	1,584
Multimedia content creation (video lectures)	55.5	1,584
Instructional design, online course creation	43.5	1,584
Online assessment creation	53.2	1,584
IT support teams	60.9	1,584
Support for Wi-Fi access or use of a personal computer	30.3	1,584
None of the above support is provided	5.0	1,584
Other	1.3	1,584
6. Does your university have an on-campus multimedia production studio to support online teaching?	51.5	1,415

COVID-19 = coronavirus disease, HEI = higher education institution, IT = information technology.

The three most effective teacher support services provided by the HEIs during the pandemic, according to the administrator respondents, were (i) IT tech support and troubleshooting services (65.9%), (ii) online introduction to a variety of updated information about remote teaching (60.8%), and (iii) authority to use various online platforms for online course management (55.4%). The three most effective student support services in their HEIs, the administrators said, were (i) IT tech support and troubleshooting services (59.1%), (ii) online introduction to a variety of updated information about remote learning and online courses (57.2%), and (iii) use and enhancement of online interaction functions (53.1%) (Table 5). The students had a similar response.

Teachers stated that their universities took effective actions to advance remote teaching during the COVID-19 pandemic. They issued a mandate to begin online teaching (85.6%) and provided online teaching and learning guides to teachers (80.4%). The HEIs, the teachers said, were least effective in supporting teachers with a laptop or desktop computer at home; only 10.5% provided such support.

Technological tools used by the teachers in remote teaching during the pandemic were videoconferencing (94.1%) and communication with students by mobile phone via SMS, WhatsApp, Viber, or Messenger (88.2%).

Regarding their training, the teachers mentioned several training types and their duration. Teaching an online course requires 3–4 hours of training for the teachers, 33.3% of the teacher respondents said; less than 3 hours, according to 29.4%. However, 7.0% of the teachers stated that no training is required to teach an online course. Teacher training in online teaching is diverse and includes options not listed among the survey items. More than 50.0% of the teacher respondents said that their HEIs provided teachers with training in blended learning techniques and models, curriculum and/or instructional design and online course creation, multimedia content creation, and online assessment. In 10.7% of cases, teachers were not trained to teach online (Table 6).

Table 6: Higher Education Institution Support for, and Promotion of, Remote Education (Faculty Responses)—Indonesia

Item	Faculty	
	Yes (%)	No.
What actions has your university taken to advance remote learning during the COVID-19 pandemic?		
Mandating online teaching	85.6	3,574
Providing guides to online teaching and learning to the faculty	80.4	3,574
Acquiring videoconferencing licenses	65.3	3,574
Enabling teacher access to digital materials	25.3	3,574
Supporting teacher access to the internet	53.5	3,574
Supporting teachers' laptop or desktop needs at home	10.5	3,574
Providing IT tech support to teachers	37.5	3,574
Training teachers in online teaching pedagogies	60.9	3,574
Other	3.1	3,574
What kinds of technological tools have you been using to support remote teaching (and learning) during the COVID-19 pandemic?		
Communicating with the students by mobile phone via SMS, WhatsApp, Viber, Messenger, etc.	88.2	3,574
Communicating with the students through email	55.7	3,574
Holding videoconferences	94.1	3,574
Uploading course materials through LMS	60.6	3,574
Communicating with the students through LMS	64.3	3,574
Uploading recorded video lectures on YouTube	30.8	3,574
Uploading recorded video lectures on LMS	33.0	3,574
Other	2.7	3,574
How many hours of training do teachers have to take to teach online courses at your university?		
No training required	7.0	3,547
Less than 3 hours of training	29.4	3,547
3–4 hours	33.3	3,547
5–7 hours	15.5	3,547
8 or more hours	14.7	3,547
Which of the following training courses for online teaching does your university provide to teachers?		
Online teaching pedagogies	46.3	3,547
Blended learning techniques and models	61.5	3,547
Curriculum/Instructional design and online course creation	52.0	3,547
Multimedia content creation (video lectures, animation, interactive simulations)	53.2	3,547
Online assessment creation	51.0	3,547
None; the university does not provide any training in online teaching to teachers	10.7	3,547
Other	1.5	3,547

COVID-19 = coronavirus disease, HEI = higher education institution, IT = information technology, LMS = learning management system.

Internet access environment. Free on-campus internet was provided by some HEIs according to 97.8% of the administrator respondents, 81.3% of the faculty members, and 83.9% of the students. The connectivity provided was fair in quality, reliability, and speed, 89% of the faculty members said (Table 7).

Regarding digital device ownership, most teacher respondents had laptops (97%), while students most often used smartphones (85.3%). Teachers and students who answered this question were highly equipped with laptops and smartphones; tablets were the least common. Students had a lower digital device ownership rate than teachers, but their device retention rate was higher.

Most students had wireless internet access (mobile broadband) at home through data plans (76.2%). The plans were affordable for a greater number of students (51.7%). Mobile network quality was fairly good and stable, according to more than 67.2% of teachers and 54.9% of students (Table 8).

Table 7: Higher Education Institution Support for, and Promotion of, Remote Education (All Responses)—Indonesia

Item	HEI Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Does your university/HEI provide FREE on-campus internet (Wi-Fi or LAN) for students, teachers, and administration?	97.8	1,584	81.3	3,574	83.9	36,579
Please rate the quality, reliability, and speed of your university's Wi-Fi (or LAN) connectivity.						
Excellent	—	—	12.0	3,574	—	—
Good	—	—	48.0	3,574	—	—
Fair	—	—	29.8	3,574	—	—
Poor	—	—	10.2	3,574	—	—

HEI = higher education institution, LAN = local area network, — = no data available.

Table 8: Faculty and Student Internet Access in Higher Education Institutions (Faculty and Student Responses)—Indonesia

Item	Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Do you OWN any of the following devices?				
Desktop computer	27.5	3,547	6.9	36,579
Laptop	97.7	3,547	78.7	36,579
Tablet	15.2	3,547	5.3	36,579
Smartphone (Android or iPhone)	89.3	3,547	85.3	36,579
Cell phone (feature phone)	17.2	3,547	15.2	36,579
None of the above	0.2	3,547	0.4	36,579
Do you have Wi-Fi/wired-LAN connection at home?	78.5	3,547	51.6	36,579
How do you have access to the internet at home?				
Landline connectivity	53.9	3,547	23.2	36,579
Mobile broadband (mobile data package)	45.7	3,547	76.2	36,579
No access to the internet	0.5	3,547	0.7	36,579
How would you rate the affordability of mobile data plans?				
Very affordable	27.5	3,547	15.4	36,528
Moderately affordable	57.8	3,547	51.7	36,528
Slightly affordable	13.0	3,547	25.4	36,528
Not affordable	1.8	3,547	7.3	36,528

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Table 8 *continued*

Item	Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
How would you describe the quality of the mobile network in your area?				
Excellent and stable	12.8	3,547	7.4	36,579
Good and stable	67.2	3,547	54.9	36,579
Poor	19.9	3,547	37.1	36,579
No network coverage	0.1	3,547	0.6	36,579

LAN = local area network.

Student Engagement in Online Learning

Adaptation to remote education and professor–student interaction. Regarding their preferred learning environment, 43.1% of the teacher respondents stated that they would rather have a 50:50 combination of online and face-to-face learning. Only 4.3% expressed a preference for fully online classes, and 22.8% would rather have completely face-to-face learning. Among the students, 36.0% favored combined learning, 7.6% preferred fully online learning, and 32.5% were ready for entirely face-to-face learning. Preference for face-to-face learning was higher among students than among teachers.

Online tools for teacher–student communication during the COVID-19 pandemic were at least moderately effective in the assessment of 77.5% of the teacher respondents and 67.4% of the students. Effective communication tools promote effective teacher–student and student–student collaboration. However, as students generally had less internet access than teachers, the online environment did not favor effective communication during this period.

Online student assessment and evaluation are acceptable to 88.6% of the students (Table 9).

Table 9: Online Communication Effectiveness and Preferred Learning Environment (Faculty and Student Responses)—Indonesia

Item	Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Which learning environment do you prefer?				
Completely face-to-face	22.8	3,547	32.5	36,579
Mostly, but not completely, face-to-face	17.9	3,547	12.3	36,579
About 50% online, 50% face-to-face	43.1	3,547	36.0	36,579
Mostly, but not completely, online	11.9	3,547	11.6	36,579
Completely online	4.3	3,547	7.6	36,579
In terms of satisfaction with communicating with your students, does the use of online communication tools during the COVID-19 pandemic make your experience as effective as it was before the pandemic?				
Not effective at all	5.4	3,547	10.9	36,579
Only slightly effective	17.1	3,547	21.7	36,579
Moderately effective	58.0	3,547	56.5	36,579
Extremely effective	19.5	3,547	10.9	36,579
Do you consider online student assessment/evaluation acceptable? (Students only)			88.6	36,579

COVID-19 = coronavirus disease.

Close to 98.0% of the teacher respondents primarily used WhatsApp to communicate with students during the COVID-19 pandemic. LMS bulletin boards or messaging (49.2%) and email (38.4%) were also used. The predominance of WhatsApp, rather than non-real-time communication, suggests that teachers often interacted with students even before the COVID-19 pandemic.

For online teaching, teachers need various technology tools. Most teacher respondents said they had intermediate-level proficiency in the use of various technology tools for online teaching: web conferencing (52.0%), digital collaboration tools (55.2%), video lectures (52%), online course development (56.9%), and online assessment (53.3%) (Table 10).

Table 10: Main Types of Communication Technology Used and Faculty Proficiency in Applying Technology Tools for Online Teaching (Faculty Responses)—Indonesia

Item	Faculty	
	Yes (%)	Responses (no.)
During the COVID-19 pandemic, what is your primary way of communicating with students?		
LMS bulletin boards or messaging	49.2	3,547
Email	38.4	3,547
WhatsApp	97.8	3,547
Facebook Messenger	3.4	3,547
LINE messaging	4.6	3,547
WeChat	3.1	3,547
Viber	0.5	3,547
SMS	10.5	3,547
None; no communication with students at all	0.2	3,547
Other	9.8	3,547
Please rate your proficiency level in using each of the following technology tools for online teaching.		
Web conferencing		
Basic	13.7	3,547
Intermediate	52.0	3,547
Advanced	32.3	3,547
Not applicable; not used	1.9	3,547
Digital collaboration tools		
Basic	15.3	3,547
Intermediate	55.2	3,547
Advanced	27.3	3,547
Not applicable; not used	2.2	3,547
Video lectures		
Basic	18.2	3,547
Intermediate	52.0	3,547
Advanced	27.2	3,547
Not applicable; not used	2.7	3,547
Online course development		
Basic	14.0	3,547
Intermediate	56.9	3,547
Advanced	28.2	3,547
Not applicable; not used	0.8	3,547
Online assessment		
Basic	12.7	3,547
Intermediate	53.3	3,547
Advanced	32.9	3,547
Not applicable; not used	1.0	3,547

COVID-19 = coronavirus disease, LMS = learning management system, SMS = short message service.

The students' level of digital literacy needed for remote classes during COVID-19 was rated at the *intermediate* level by 71.5% of the student respondents, at the *novice* level by 13.0%, and at the *advanced* level by 15.5%. Teachers' knowledge or expertise in using online learning tools during the pandemic received *good* (61.5%) or *very good* (20.2%) ratings from the students. Only 3.0% of the students said that their teachers had poor knowledge or expertise in the use of online learning.

Most students asked to rate their level of adaptation to remote learning said they had adapted *moderately* or *very well* to the following online learning experiences: class preparation (67.2%), instructors' lectures (68.2%), use of class materials (68.8%), laboratory simulations (52.9%), team projects (61.0%), assignments (74.9%), assessments (73.4%), and feedback (66.6%) (Table 11).

Table 11: Student Level of Digital Literacy and Adaptation for Remote Classes (Student Responses)—Indonesia

Item	Students	
	Yes (%)	Responses (no.)
How would you rate your current level of digital literacy needed for remote classes during the COVID-19 pandemic?		
Novice	13.0	36,579
Intermediate	71.5	36,579
Advanced	15.5	36,579
How would you rate your teachers' knowledge/expertise in the use of online learning tools?		
Very good	20.2	36,579
Good	61.5	36,579
Fair	15.4	36,579
Poor	2.5	36,579
Very poor	0.5	36,579
Rate your level of adaptation to the following remote learning experiences during the COVID-19 pandemic.		
Class preparation		
Not at all adapted	3.1	36,515
Only slightly adapted	27.4	36,515
Moderately adapted	37.3	36,515
Very well adapted	29.9	36,515
Not applicable; not experienced online during the pandemic	2.1	36,515
Instructors' lectures		
Not at all adapted	2.7	36,245
Only slightly adapted	26.7	36,245
Moderately adapted	40.0	36,245
Very well adapted	28.2	36,245
Not applicable; not experienced during the pandemic	1.5	36,245
Use of class materials		
Not at all adapted	2.9	36,334
Only slightly adapted	26.3	36,334
Moderately adapted	40.4	36,334
Very well adapted	28.4	36,334
Not applicable; not experienced during the pandemic	1.4	36,334
Laboratory simulations		
Not at all adapted	9.2	36,282
Only slightly adapted	29.9	36,282
Moderately adapted	34.9	36,282
Very well adapted	18.0	36,282
Not applicable; not experienced during the pandemic	7.2	36,282
Team projects		
Not at all adapted	5.6	36,272
Only slightly adapted	29.1	36,272
Moderately adapted	38.2	36,272
Very well adapted	22.8	36,272
Not applicable; not experienced during the pandemic	3.5	36,272

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Table 11 *continued*

Item	Students	
	Yes (%)	Responses (no.)
Assignments		
Not at all adapted	2.1	36,310
Only slightly adapted	21.4	36,310
Moderately adapted	39.0	36,310
Very well adapted	35.9	36,310
Not applicable; not experienced during the pandemic	0.8	36,310
Assessments (grading, exams, or quizzes)		
Not at all adapted	2.2	36,320
Only slightly adapted	22.6	36,320
Moderately adapted	40.6	36,320
Very well adapted	32.8	36,320
Not applicable; have not experienced online assessments during the pandemic	1.1	36,320
Feedback		
Not at all adapted	3.2	36,196
Only slightly adapted	27.4	36,196
Moderately adapted	42.0	36,196
Very well adapted	24.6	36,196
Not applicable; not experienced during the pandemic	1.8	36,196

COVID-19 = coronavirus disease.

Teacher respondents rated student attainment levels through remote learning *very high* or *somewhat high* as follows: learning motivation (49.0%), major knowledge and skills (57.1%), collaborative learning experience (49.4%), and learning engagement (53.1%). The teachers also rated *very high* or *moderately high* the student learning gap (40.4%) and learning burden (68.0%). Student ratings were *very high* or *moderately high* for learning motivation (52.5%), major knowledge and skills (55.0%), collaborative learning experience (54.3%), and learning engagement (62.9%). Students also gave *very high* or *moderately high* ratings to student interaction with classmates (54.8%) and interaction with professors (45.4%).

Regarding the overall remote learning experience during the COVID-19 pandemic, 78.0% of the student respondents said that they were *moderately satisfied* or *very satisfied*.

Online Learning Engagement of Low-Income Students

Effectiveness of the use of online communication tools, level of digital literacy, satisfaction with the remote learning experience, obstacles or problems in remote learning, and online and on-campus learning experiences during the COVID-19 pandemic were rated by students grouped according to their perceived socioeconomic status (including students coming from poor families with very little or no education and working in low-paying jobs, to students from wealthy, highly educated families holding high-paying jobs).

The use of online communication tools was declared extremely effective by 10.6% of low-income students, as well as 9.8% of lower-middle-income, 11.0% of upper-middle-income, and 13.9% of high-income students. However, for 16.2% of students in the low-income group, and also for 11.3% of lower-middle-income, 9.2% of upper-middle-income, and 10.2% of high-income students, the use of the tools was ineffective.

Concerning their level of digital literacy, 11.9% of low-income, 13.2% of lower-middle-income, 17.4% of upper-middle-income, and 20.1% of high-income students placed themselves at the advanced level. On the other hand, 23.5% of low-income, 13.5% of lower-middle-income, 9.9% of upper-middle-income, and 10.8% of high-income

students said their digital literacy was no higher than the novice level. Student socioeconomic status accounts, at least in part, for their level of digital literacy.

Students from different socioeconomic groups also responded differently when asked about their satisfaction with the overall remote learning experience. Among low-income students, 13.5% declared themselves very satisfied, as did 11.3% of lower-middle-income, 13.4% of upper-middle-income, and 16.5% of high-income students. Dissatisfaction was high, however, among 6.0% of low-income, 3.4% of lower middle-income, 2.6% of upper-middle-income, and 3.0% of high-income students.

Concerning obstacles or problems encountered in online learning, (i) poor access to technology devices was mentioned by 22.9% of low-income, 13.2% of lower-middle-income, 9.3% of upper-middle-income, and 11.3% of high-income students; (ii) lack of internet connection by 32.2% of low-income, 25.2% of lower-middle-income, 21.3% of upper-middle-income, and 22.9% of high-income students; and (iii) poor-quality internet connection by 82.7% of low-income, 85.2% of lower-middle-income, 83.3% of upper-middle-income, and 80.8% of high-income students. The overall poor quality of internet access and speed nationwide affects all students regardless of socioeconomic status.

Fatigue, boredom, and stress from prolonged screen time were obstacles or problems presented by online learning by 53.6% of low-income, 62.7% of lower-middle-income, 65.0% of upper-middle-income, and 60.7% of high-income students. More than half of the students, regardless of socioeconomic status, endure this difficulty at this time because of sustained computer use.

Maintaining faculty–student interaction was another obstacle or problem brought up by 26.0% of low-income, 27.6% of lower-middle-income, 28.9% of upper-middle-income, and 26.7% of high-income students.

The obstacle or problem, i.e., difficulties experienced in online assessments and exams, was raised by 24.7% of low-income, 20.7% of lower-middle-income, 24.0% of upper-middle-income, and 38.8% of high-income students.

Comparing online and on-campus lectures, (i) 66.1% of low-income, 61.1% of lower-middle-income, 57.9% of upper-middle-income, and 58.8% of high-income students said that on-campus lectures were better; (ii) 9.7% of low-income, 9.2% of lower-middle-income, 11.1% of upper-middle-income, and 11.7% of high-income students said that online lectures were better; and (iii) 18.3% of low-income, 20.7% of lower-middle-income, 21.1% of upper-middle-income, and 21.7% of high-income students expressed no preference for either mode of instruction. More than 57% of students, regardless of socioeconomic status, said that they preferred face-to-face lectures on campus. Online lectures fared slightly better, but not by much, among those in the high-income group (Table 12).

The level of attainment achieved through remote learning and learning motivation ranked *very low* or *moderately low* among 54.3% of low-income student respondents and *moderately high* or *very high* among 45.7%. Among 5,796 high-income students, 40.8% gave a *very low* or *moderately low* rating to learning motivation, and 59.1%, a rating of *moderately high* or *very high*.

Major knowledge was rated *very low* or *moderately low* by 55.4% of low-income students, and *moderately high* or *very high* by 44.6%. In the high-income group, 37.9% gave it a *very low* or *moderately low* rating, and 62.1%, a *moderately high* or *very high* rating.

Table 12: Student Online Learning Experience, by Socioeconomic Status (All Responses)—Indonesia

Item	Low (1, 2, 3)		Lower Middle (4, 5)		Upper Middle (6, 7)		High (8, 9, 10)	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
In terms of satisfaction with communicating with your teachers and classmates, does the use of online communication tools during the COVID-19 pandemic make your experience as effective as it was before the pandemic?								
Not effective at all	16.2	3,471	11.3	13,380	9.2	11,548	10.2	5,804
Only slightly effective	23.3	3,471	22.5	13,380	21.5	11,548	18.7	5,804
Moderately effective	49.9	3,471	56.5	13,380	58.4	11,548	57.3	5,804
Extremely effective	10.6	3,471	9.8	13,380	11.0	11,548	13.9	5,804
How would you rate your current level of digital literacy needed for remote classes during the COVID-19 pandemic?								
Novice	23.5	3,471	13.5	13,380	9.9	11,548	10.8	5,804
Intermediate	64.6	3,471	73.3	13,380	72.7	11,548	69.0	5,804
Advanced	11.9	3,471	13.2	13,380	17.4	11,548	20.1	5,804
How satisfied are you with the overall remote learning experience during the COVID-19 pandemic?								
Very satisfied	13.5	3,471	11.3	13,380	13.4	11,548	16.5	5,804
Moderately satisfied	57.3	3,471	65.5	13,380	67.5	11,548	64.2	5,804
Dissatisfied	23.2	3,471	19.8	13,380	16.4	11,548	16.3	5,804
Very dissatisfied	6.0	3,471	3.4	13,380	2.6	11,548	3.0	5,804
What obstacles or problems have you encountered in remote learning (both online and offline) during the COVID-19 pandemic?								
No access to technology devices	22.9	3,471	13.2	13,380	9.3	11,548	11.3	5,804
No internet connection	32.2	3,471	25.2	13,380	21.3	11,548	22.9	5,804
Poor internet connection	82.7	3,471	85.2	13,380	83.3	11,548	80.8	5,804
Poor quality of video collaboration software	27.2	3,471	27.7	13,380	24.0	11,548	22.4	5,804
Fatigue, boredom, and stress from continuous screen viewing	53.6	3,471	62.7	13,380	65.0	11,548	60.7	5,804
Difficulties in faculty–student interaction	26.0	3,471	27.6	13,380	28.9	11,548	26.7	5,804
Difficulties in online assessments and exams	24.7	3,471	20.7	13,380	24.0	11,548	38.8	5,804
How would you compare online versus on-campus lectures?								
On-campus lectures are better	66.1	3,471	61.1	13,380	57.9	11,548	58.8	5,804
Online lectures are better	9.7	3,471	9.2	13,380	11.1	11,548	11.7	5,804
No preference: online and on-campus lectures are the same	18.3	3,471	20.7	13,380	21.1	11,548	21.7	5,804
No comment	5.9	3,471	9.0	13,380	9.8	11,548	7.8	5,804

COVID-19 = coronavirus disease.

Collaborative learning experience received a *very low* or *slightly low* rating from 56.3% of low-income students, and a rating of *moderately high* or *very high* from 43.7%. Among high-income students, it was rated *very low* or *moderately low* by 39.3%, and *slightly high* or *very high* by 60.7%.

Low-income students (44.8%) rated learning engagement *very low* or *somewhat low*; 55.2% gave it a rating of *moderately high* or *very high*. In the high-income group, 30.7% rated it *very low* or *moderately low*, and 69.3%, *moderately high* or *very high* (Table 13).

Table 13: Student Attainment, by Socioeconomic Status—Indonesia

Item	Low (1, 2, 3) Yes (%)	Low (1, 2, 3) Responses (no.)	Lower Middle (4, 5) Yes (%)	Lower Middle (4, 5) Responses (no.)	Upper Middle (6, 7) Yes (%)	Upper Middle (6, 7) Responses (no.)	High (8, 9, 10) Yes (%)	High (8, 9, 10) Responses (no.)
Rate the level of attainment you have reached through remote learning for each student learning experience.								
Learning motivation								
Very low	12.9	3,463	7.8	13,355	5.9	11,530	6.6	5,796
Moderately low	41.4	3,463	40.5	13,355	40.3	11,530	34.2	5,796
Moderately high	32.3	3,463	40.5	13,355	42.2	11,530	42.5	5,796
Very high	13.4	3,463	11.2	13,355	11.5	11,530	16.6	5,796
Major knowledge (and skills)								
Very low	10.7	3,455	5.3	13,349	3.3	11,530	4.6	5,786
Moderately low	44.7	3,455	42.4	13,349	37.5	11,530	33.3	5,786
Moderately high	35.5	3,455	44.6	13,349	50.3	11,530	48.9	5,786
Very high	9.1	3,455	7.7	13,349	8.9	11,530	13.2	5,786
Collaborative learning experience								
Very low	11.1	3,445	6.7	13,329	4.4	11,516	5.0	5,776
Moderately low	45.2	3,445	41.9	13,329	36.2	11,516	34.3	5,776
Moderately high	34.1	3,445	42.7	13,329	48.8	11,516	46.9	5,776
Very high	9.6	3,445	8.6	13,329	10.6	11,516	13.8	5,776
Learning engagement								
Very low	8.7	3,441	4.5	13,321	3.2	11,509	3.9	5,776
Moderately low	36.1	3,441	34.1	13,321	30.9	11,509	26.8	5,776
Moderately high	38.5	3,441	47.1	13,321	50.4	11,509	48.5	5,776
Very high	16.7	3,441	14.3	13,321	15.4	11,509	20.8	5,776

Challenges and Issues

Major sources of funding for online learning—according to administrator respondents—are the HEIs (75.8%), the government (16.1%), and the private sector or nonprofit organizations (8.4%).

For teacher respondents, the top three challenges of online teaching were (i) limited student access to devices (56.3%); (ii) limited knowledge of, and training in, online teaching (46.5%); and (iii) a lack of incentives for online teaching (39.8%).

The top three disadvantages of online teaching and learning according to the teachers were (i) the need for technology devices and reliable internet access (82.7%); (ii) unmotivated and often distracted students (78.4%); and (iii) difficulties in student engagement when the audio/video equipment is turned off (76.7%) (Table 14).

The top three challenges or obstacles in the deployment of remote learning (online and/or offline) for administrator respondents in the survey were (i) low access of students to the internet and devices (69.8%); (ii) university bandwidth and internet connectivity issues (40.0%); and (iii) lack of teacher know-how in remote teaching and learning (25.5%).

The top three challenges for respondents were (i) poor internet connection (64.7%); (ii) difficulties in assessing student performance (59.8%); and (iii) poor engagement with students, especially when the video/audio equipment is turned off (50.7%).

For the student respondents, the top three challenges were (i) poor internet connection (83.4%); (ii) fatigue, boredom, and stress from continuous screen viewing (62.1%); and (iii) difficulties in maintaining faculty–student interaction (27.6%) (Table 15).

Table 14: Challenges and Issues in Online Teaching and Learning (Higher Education Institutions' Administrator and Faculty Responses)—Indonesia

Item	HEI Administrators or Faculty	
	Yes (%)	Responses (no.)
What funding sources does your university currently have for online learning? (HEI administrators only)		
No current funding for online learning	9.0	1,584
Own school funds	75.8	1,584
Government	16.1	1,584
ADB / World Bank / Development partners	2.5	1,584
Private sector or nonprofit organizations	8.4	1,584
Other	2.7	1,584
What do you regard as the main CHALLENGES of ONLINE TEACHING in your school? (Faculty only)		
No online teaching in our school (the university has little or no experience in online teaching)	6.6	3,547
Limited knowledge of, and training in, online teaching	46.5	3,547
Lack of incentives for online teaching	39.8	3,547
Poor internet connectivity in the university	24.3	3,547
Poor/No internet access provided for faculty and students	32.7	3,547
Limited student access to devices (PC, laptop, tablet, android cell phone)	56.3	3,547
Limited IT technical support	29.4	3,547
Other	5.5	3,547
Of the following, which do you think are the disadvantages of online teaching and learning? (Faculty only)		
Need for technology devices and reliable internet access	82.7	3,547
Financial burden due to the high cost of mobile data package	64.1	3,547
Challenging student engagement (e.g., inability to interact with students when their audio/video equipment is turned off)	76.7	3,547
Unmotivated, often distracted students	78.4	3,547
Visual fatigue from sustained computer screen and mobile phone viewing	72.5	3,547
Difficulty with practical, hands-on classroom activities	56.6	3,547
Lack of social interaction	70.6	3,547
Other	2.4	3,547

ADB = Asian Development Bank, HEI = higher education institution, IT = information technology, PC = personal computer.

Table 15: Challenges and Issues in Online Teaching and Learning (All Responses)—Indonesia

Items	Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
What are the main challenges or obstacles in the deployment of remote learning (online and/or offline) during the COVID-19 pandemic?						
Insufficient university budget for online infrastructure (internet, equipment, device)	21.7	1,584				
Insufficient budget to cover university staff/faculty salaries	10.0	1,584				
Lack of teacher know-how in remote teaching and learning	25.5	1,584				
Lack of teacher interest or motivation; resistance to change	12.6	1,584				
University bandwidth issues, poor internet connectivity	40.0	1,584				
Limited/no access to the internet and devices (PC, laptop, tablet, smartphone) among students	69.8	1,584				
Other	9.1	1,584				

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Table 15 *continued*

Items	Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
What are the main challenges or obstacles in the deployment of remote learning (online and/or offline) during the COVID-19 pandemic?						
No access to technology devices (laptop, smartphone)			8.4	3,547		
No internet connection			10.9	3,547		
Poor internet connection			64.7	3,547		
Inadequate/No skills in remote teaching			14.2	3,547		
No training in the use of technology tools			12.0	3,547		
Poor teacher engagement with students (e.g., inability to interact with students when their video/audio equipment is turned off)			50.7	3,547		
Difficulty in assessing student performance			59.8	3,547		
Other			9.4	3,547		
What are the main challenges or obstacles in the deployment of remote learning (online and/or offline) during the COVID-19 pandemic?						
No access to technology devices (laptop, smartphone, or laptop)					12.7	36,579
No internet connection					24.3	36,579
Poor internet connection					83.4	36,579
Poor quality of video collaboration software					25.4	36,579
Fatigue, boredom, and stress from continuous screen viewing					62.1	36,579
Difficulties in maintaining faculty–student interaction					27.6	36,579
Difficulties in online assessments and exams					20.2	36,579

COVID-19 = coronavirus disease, PC = personal computer.

Nepal

Demographic Information

Higher education institution background information. In this research study, 57.5% of the student respondents from Nepal were enrolled in public HEIs, and 88.1% were full-time students. For each type of survey respondent, more than 80.0% of HEIs were in the urban areas. At least half of the HEIs had 20,000 or more students enrolled in undergraduate programs. The HEI administrator respondents held department or faculty chair or head registrar positions (16.7%), and other positions (83.3%), and the teacher respondents were mostly lecturers (68.8%) (Table 16).

Student background information. All of the participating students were domestic students, predominantly male (61.4%), staying for the most part in urban areas (84.3%), and some near HEIs (56.7%). Family members (relatives) housed 61.4% of the students, and the family or guardian provided financial support for tuition fees and living expenses of 62.2% of the students. Asked for a self-evaluation of their socioeconomic status, 49.2% of the student respondents placed themselves in the lower-middle-class group (levels 4 and 5). Self-employment (farming) was the main source of household income for 20.5%. For the greatest number, both fathers (37.0%) and mothers (49.6%) had not gone beyond primary school (Table 17).

Table 16: Higher Education Institution Background Information (All Responses)—Nepal

Item	HEI Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Public or private HEI						
Public	83.3	6	66.7	9	57.5	193
Private	16.7	6	33.3	9	42.5	193
HEI location						
Urban	83.3	6	95.3	128	93.3	193
Rural	16.7	6	4.7	128	6.7	193
Estate	0.0	6	0.0	128	0.0	193
How many students are enrolled in undergraduate programs?						
Fewer than 1,000	0.0	6	—	—	—	—
1,000–2,499	0.0	6	—	—	—	—
2,500–4,999	16.7	6	—	—	—	—
5,000–9,999	16.7	6	—	—	—	—
10,000–19,999	16.7	6	—	—	—	—
20,000 or more	50.0	6	—	—	—	—
Current position						
Rector	0.0	6	—	—	—	—
Vice-chancellor	0.0	6	—	—	—	—
Dean	0.0	6	—	—	—	—
Department/Faculty chair or head registrar	16.7	6	—	—	—	—
Professor	—	—	5.5	128	—	—
Associate professor	—	—	8.6	128	—	—
Assistant professor	—	—	7.8	128	—	—
Senior lecturer	—	—	6.3	128	—	—
Lecturer	—	—	68.8	128	—	—
Full-time student	—	—	—		88.1	193
Other	83.3	6	3.1	128	—	—

HEI = higher education institution, — = no data available.

Table 17: Student Background Information—Nepal

Item	Students	
	Yes (%)	Responses (no.)
Gender		
Male	61.4	127
Female	38.6	127
Nationality		
Domestic	100.0	127
Foreign	0.0	127
Current residence location		
Urban	84.3	127
Rural	15.7	127
Estate	0.0	127
Boarding near the HEI	56.7	127

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Table 17 *continued*

Item	Students	
	Yes (%)	Responses (no.)
Housing status		
Student dormitory (on-campus)	10.2	127
Living with family members (relatives)	61.4	127
Independent	28.3	127
Main source of funding for tuition fees and cost of living		
Scholarship (waived tuition fee)	11.8	127
Self-financed (by the family or guardian)	62.2	127
Self-financed (by the student)	18.1	127
Student loan	7.1	127
Other	0.8	127
Self-evaluated socioeconomic status		
Low (levels 1–3)	15.9	126
Lower-middle (levels 4 and 5)	49.2	126
Upper-middle (levels 6 and 7)	29.4	126
High (levels 8–10)	5.6	126
Main source of household income		
Salaries and wages (government employment)	15.7	127
Salaries and wages (private sector employment)	18.9	127
Salaries and wages (foreign employment)	11.8	127
Self-employment income (running own business)	18.1	127
Self-employment income (farming)	20.5	127
Self-employment income (casual work)	8.7	127
Charity (donations from relatives)	2.4	127
Pensions	0.8	127
Net property income (interest and other investment income received)	2.4	127
Other	0.8	127
Father's highest level of education		
Completed at least some primary education	37.0	127
Completed at least some secondary education	34.6	127
Completed technical and vocational education	4.7	127
Completed at least some university/college education	15.0	127
Don't know / Not applicable	8.7	127
Mother's highest level of education		
At least some primary education	49.6	127
At least some secondary education	29.9	127
Completed technical and vocational education	5.5	127
At least some university/college education	11.0	127
Don't know / Not applicable	3.9	127

HEI = higher education institution.

Internet and Technology Access

Remote education during the COVID-19 pandemic. During the COVID-19 pandemic, more than 84% of HEIs in Nepal were providing remote learning, according to the student and teacher respondents. Online learning was the delivery method most often used, 33.3% of HEI administrators and 78.6% of teacher respondents said. None of the HEI administrator respondents reported the combined use of online and offline learning, but 19.4% of the teachers and 14.7% of the student respondents said that their HEIs use both learning methods in providing remote learning.

Higher education institution support for, and promotion of, remote education. The following areas of support for teachers were mentioned as the three most frequently provided by HEIs: (i) instructional design and online course creation (33.3%); (ii) multimedia content creation (16.7%); and (iii) Wi-Fi or personal computer access (16.7%).

About 33.3% of the administrator respondents said that their HEIs have a network operations center but no IT support team. None of the administrators reported having an on-campus multimedia production studio to aid in online education in their HEIs.

Administrators (16.7%) said that HEI support for teachers in the following areas was mostly effective during the pandemic: (i) workshops in online training and skills and remote teaching, (ii) incentives to motivate the teachers, (iii) IT tech support and troubleshooting services, (iv) online introduction to updated and varied information on remote teaching, (v) authority to use a single platform or several platforms for online course management, and (vi) high-quality digital content and operating environment. The updating and use of the results of online course management and student achievement monitoring do not seem to be perceived by the HEIs as a priority area of support.

In the case of students (16.7%), the following types of HEI support were perceived as more effective than other types: (i) workshops in online training and skills, (ii) guides to remote learning, (iii) education maintenance allowance, (iv) IT tech support and troubleshooting services, (v) online introduction to updated and varied information on remote learning and online courses, and (vi) authority to use a single platform or several platforms for online course management.

The teachers reported that the three most effective actions taken by their universities to advance remote teaching during the COVID-19 pandemic were (i) providing guides to online teaching and learning (60.9%), (ii) acquiring videoconferencing licenses (55.5%), and (iii) mandating online teaching (52.3%). However, HEI support for teachers' use of laptops or desktop computers at home was declared least effective (10.2%).

The teachers used videoconferencing most often (71.9%) to support remote teaching and learning during the pandemic. They said that they also often communicate with their students by email (55.5%).

HEIs required that most of their teacher respondents (82.1%) go through 4 hours of training or less to teach online courses: 3–4 hours of training for 27.0%, up to 3 hours for 28.1%, and no training at all for 27.0%. The training provided by the HEIs themselves deals mostly with blended learning techniques and models (37.5%), online assessment creation (32.0%), and online teaching pedagogies (31.3%). About 30.0% of the teacher respondents have also been trained in curriculum or instructional design and online course creation (28.1%) and multimedia content creation (video lectures, animation, interactive simulations) (29.7%). However, 12.5% said that they had received no training from their HEIs to teach online.

Internet access environment. According to 33.3% of administrator respondents, 85.4% of teachers, and 40.7% of students, their HEIs provided free on-campus internet. The on-campus Wi-Fi (or local area network [LAN]) facilities, in the assessment of 83.2% of teacher respondents, were fair in quality, reliability, and speed, or better.

More than half of the teacher respondents said that they owned laptops (66.4%) and smartphones (57.8%). While fewer students (44.0%) had laptops, more than half owned smartphones (57.5%). Overall, the students were less equipped with devices than the teachers: besides the sizable difference in laptop ownership, more than 14.0% of the teachers, but only 8.8% of the students, owned tablets.

Most of the student respondents (70.7%) had a landline internet connection at home; others (25.7%) relied on mobile broadband (mobile data plans). Mobile data plans were at least moderately affordable to 35.0% of

the students, but not affordable at all to 30.0%. Mobile network quality was stable in most of the students' and teachers' homes. But for 21.3% of the teachers and 27.1% of the students, network quality was poor, and 2.9% of the students had no network coverage in their area.

Student Engagement in Online Learning

Adaptation to remote education and professor–student interaction. Concerning their preferred learning environment, 34.8% of teacher respondents expressed a preference for a 50:50 blended learning model, 27.0% favored fully face-to-face classes, and only 3.4% wanted to go completely online. Among the students, an even higher proportion (39.3%) preferred completely face-to-face classes.

Online communication during the pandemic was at least moderately effective for more than 82.0% of the teacher respondents, but only 37.3% of the students agreed. More than 60.0% of the students consider online communications to be slightly effective or ineffective. The students may be less satisfied with online communications because they were less well equipped than their teachers for good-quality communication.

A little more than half of the students consider online student assessment and evaluation acceptable.

To communicate with students during the COVID-19 pandemic, more than 61.7% of the teacher respondents primarily used email. They also used Facebook Messenger (33.6%), LMS bulletin board or messaging in LMS (28.1%), and SMS (17.2%). In addition, almost 30.0% of the teachers used other tools as well to communicate.

To teach online, teachers need various technology tools including web conferencing, digital collaboration tools, video lectures, online course development, and online assessment. Most teachers placed their proficiency in the use of the following technology tools for online teaching at the intermediate level: web conferencing (55.1%), digital collaboration tools (59.1%), video lectures (48.3%), online course development (43.8%), and online assessment (50.6%).

Students asked to assess their digital literacy for remote learning during the COVID-19 pandemic placed it at the novice (22.9%), intermediate (58.6%), or advanced (18.6%) level. Teacher knowledge or expertise in using online learning tools during the COVID-19 pandemic was good or better according to 50.0%: good (42.9%), very good (7.1%). Only 10.7% of the students said that their teachers had poor knowledge or expertise in the use of online learning.

Student online learning experiences cover class preparation, instructor lectures, use of class materials, laboratory simulations, team projects, assignments, assessments, and feedback. Student respondents rated their level of adaptation to remote learning as *moderately adapted* or *very well adapted* in most cases: class preparation (55.7%), instructor lectures (50.0%), use of class materials (50.0%), team projects (37.0%), assignments (62.4%), assessments (54.7%), and feedback (41.9%). Only adaptation to laboratory simulations (17.3%) had generally lower ratings.

In the level of student attainment through remote learning, 98 faculty members gave *very high* or *moderately high* ratings to the following: learning motivation (37.7%), major knowledge and skills (59.4%), collaborative learning experience (46.4%), and learning engagement (38.2%). They gave similar ratings to the student learning gap (41.9%) and learning burden (63.3%). Students, on the other hand, rated the following *very high* or *moderately high*: learning motivation (39.2%), major knowledge and skills (40.1%), collaborative learning experience (31.8%), learning engagement (34.9%), and interaction with classmates (32.2%) and with professors (31.3%).

Regarding the overall remote learning experience during the COVID-19 pandemic, 70.7% of students said that they were *very satisfied* or *moderately satisfied*.

Differences between income groups were even more marked when it came to access to technology devices: 20.0% of students in the low-income group and 0.0% in the high-income group had no access. In contrast, difficulties because of poor internet connection were noted by 85.7% of high-income students and by 55.0% in the low-income group. Teacher–student interaction and online assessments and exams created problems for students in lower-income groups but not for high-income students. The same was true of fatigue, boredom, and stress from continuous screen viewing. This problem affected 40.0% of students in the low-income group, 37.1% of those in the lower-middle-income group, and 40.5% of those in the upper-middle-income group, but none in the high-income group.

Preference for on-campus lectures over online lectures was most evident among upper-middle-income students (73.0%), followed by students in the lower-middle-income (64.5%) and low-income (50.0%) groups. For students in the high-income group, however, online lectures were considered better (42.9%), while on-campus lectures were preferred by 28.6%. An equal proportion expressed no preference between the two options.

On the level of attainment achieved through remote learning, learning motivation was rated *very low* or *moderately low* by 70.0% of low-income students, and *somewhat high* or *very high* by 30.0%. All high-income students (100.0%), on the other hand, gave it a *moderately high* or *very high* rating.

Major knowledge received a *very low* or *moderately low* rating from 75.0% of the low-income students, and *moderately high* or *very high* from 25.0%. The ratings from high-income students were *very low* or *moderately low* (33.3%), and *moderately high* or *very high* (66.6%).

Ratings of *very low* or *moderately low* were given to collaborative learning experience by 80.0% of low-income students, and *moderately high* or *very high* by 20.0%. Half of the high-income students (50.0%) rated it *very low* or *moderately low*, and the other half, *moderately high* or *very high*.

Learning engagement was rated *very low* or *moderately low* by 60.0% of low-income students, and 40.0% as *moderately high* or *very high*. From high-income students, the ratings were 28.6% *very low* or *moderately low*, and 71.4% were *moderately high* or *very high*.

Online Learning Engagement of Low-Income Students

According to student-perceived socioeconomic status (1: poor, no education, and low paying job to 10: rich, highly educated, and high paying job), the effectiveness of using online communication tools, level of digital literacy, satisfaction with overall remote learning experience, obstacle or problems in remote learning courses, and online and on-campus learning experiences during the COVID-19 pandemic were analyzed.

On the effectiveness of using online communication tools, 0.0% of the low-income students (20), 4.8% of the lower-middle-income students (62), 5.4% of the upper-middle-income students (37), and 0.0% of the high-income students (7) answered that it was extremely effective. However, among the students who answered, 45.0% (20) of low-income students who answered said that it was not effective at all, along with 25.8% of lower-middle-income students (62), 24.3% of upper-middle-income students, and none of the high-income students (7).

On the level of digital literacy, students who answered that it was at an advanced level included 15.0% of the low-incomes (20), 19.4% of the lower-middle-incomes (62), 21.6% of the upper-middle-incomes (37), and the 28.6% of high-incomes (7). However, 25.0% of the low-income group (20), 21.0% of the

lower-middle-income (62), 21.6% of the upper-middle-income, and 42.9% of the high-income (7) students answered that it was at a novice level.

On the satisfaction with overall remote learning experience, 10.0% of the low-income students (20) rated that they were *very satisfied*, along with 14.5% of the lower-middle-incomes (62), 5.4% of the upper-middle-incomes (37), and 28.6% of the high-incomes (7). However, 15.0% of the low-income group (20), 3.2% of the lower-middle-income group (62), 0.0% of the upper-middle-income group, and 14.3% of the high-income group (7) answered that it was *very dissatisfying*.

On obstacles or problems, a high portion of the students had problems with a poor internet connection, and the pattern shown by student economic level differed from other difficulties. In most of the obstacles and problems, the lower-income groups showed higher difficulties: the students with no internet connection were highest in low-income groups (25.0%) and lowest in the upper-middle-income group (13.5%), which was similar to the high-income group (14.3%); the students with no access to technology devices was highest in low-income group, followed by 19.4% of the lower-middle-income group, 13.5% of the upper-middle-income group, and lowest in the high-income group (0.0%). Also, difficulties in online assessments and exams and maintaining faculty–student interaction showed a large difference between low-income students and high-income students. However, in the case of poor internet connection, as high as 85.7% of the high-income students answered that they felt difficulties while only 55.0% of the low-income students said they did, too.

Fatigue, boredom, and stress from continuously watching the screen, maintaining faculty–student interaction, and difficulty in online assessments and exams were the types of obstacles and problems in which students in high-income group showed no difficulties but which those in other income groups showed relatively higher difficulties. For instance, regarding fatigue, boredom, and stress from continuously watching the screen, 40.0% of students in the low-income group, 37.1% of students in the lower-middle-income group, and 40.5% of students in the upper-middle-income group answered that they feel difficulties, but none from the high-income group consented.

In comparison between online and on-campus lectures, the income group that expressed a preference for on-campus lectures the most was 73% of the upper-middle-income group. This was followed by the lower-middle-income group (64.5%) and the low-income group (50.0%). In the three groups, students mostly answered that on-campus lectures were preferable to other options. However, in the high-income group, students who answered that online lectures were better than on-campus lectures took the highest portion with 42.9% of them showing agreement. In this group, the students who answered that on-campus lectures were better equaled that of the 28.6% of students who had no preference for either of the two options.

In level of attainment (learning motivation, major knowledge, collaborative learning experience, learning engagement, interaction with classmates, and interaction with professors) through remote learning, learning motivation in 70.0% of low-income students was *very low* and *somewhat low*, and 30.0% *somewhat high* and *very high*. No high-income students (0.0%) reported levels as *low* or *somewhat low,* but 100.0% reported *somewhat high* and *very high*.

Major knowledge in low-income students was 75.0% *very low* and *somewhat low* and 25% *somewhat high* and *very high*, while 33.3% in high-income students was *very low* and *somewhat low*, and 66.6% *somewhat high* and *very high*.

Collaborative learning experience was 80.0% *very low* and *somewhat low* and 20.0% *somewhat high* and *very high* in low-income students, and 50.0% *very low* and *somewhat low* and 50.0% *somewhat high* and *very high* in high-income students.

Learning engagement was 60.0% *very low* and *somewhat low* and 40.0% *somewhat high* and *very high* in low-income students, and 28.6% *very low* and *somewhat low* and 71.4% *somewhat high* and *very high* in high-income students.

Challenges and Issues

Regarding major sources of funding for online learning, 16.7% of administrator respondents said that they received no funding for the program.

The top three challenges of online teaching, according to teachers, were (i) limited student access to devices (32.8%); (ii) lack of incentives for online teaching (31.3%); and (iii) poor/no internet access for teachers and students (29.7%).

The teachers also mentioned that the top three disadvantages of online teaching and learning were (i) the need for technology devices and reliable internet access (57.8%); (ii) unmotivated, often distracted students (56.3%); and (iii) difficulties in student engagement (43.8%).

The main challenges or obstacles in the deployment of remote learning (online and/or offline) cited by 33.3% of the administrator respondents had to do with budget insufficiency to cover the salaries of university staff/faculty to carry out remote learning.

The top three challenges or obstacles, according to faculty members were (i) poor engagement with students (54.7%); (ii) difficulties in assessing student performance (53.9%); and (iii) poor internet connection (53.1%).

For the students, the top three challenges or obstacles were (i) poor internet connection (50.3%); (ii) problems in maintaining faculty–student interaction (29.5%); and (iii) fatigue, boredom, and stress from continuous screen viewing (29.0%).

Pakistan

Demographic Information

Higher education institution background information. Most of the students from Pakistan in the survey (84.3%) were enrolled in public HEIs; most (96.2%) were full-time students. For each respondent group, the HEIs they represented were, for the most part, urban: 58.3% of the administrators, 89.1% of the teachers, and 74.1% of the students. In the HEIs represented by the administrator respondents, undergraduate programs with 5,000–9,999 enrolled students had the largest share of the total (41.7%). Rector or department and/or faculty chair or head registrar positions were held by the highest percentage of administrator respondents (8.3% for each position); 83.3% occupied "other" positions. Teachers at the assistant professor level made up the majority of the teacher respondents (69.6%) (Table 18).

Student background information. Participating domestic students were predominantly female (93.6%). Most (61.1%) were living in urban areas, and some of them (26.1%) near HEIs. Family members (relatives) provided housing to 74.8% of the student respondents, and the family or guardian provided financial support to 68.4% for tuition fees and living expenses. The highest percentage of student respondents (36.1%) placed themselves in the lower-middle socioeconomic class (levels 4 and 5). For 30.8% of the student respondents, salaries and wages (government employment) were the main sources of household income. The education level reached by the parents showed a marked difference. While the fathers of 32.9% (the largest proportion) had at least some university or college education, most of the mothers (53.8%) had not gone beyond primary school (Table 19).

Table 18: Higher Education Institution Background Information (All Responses)—Pakistan

Item	HEI Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Public or private HEI						
Public	91.7	12	45	97.8	84.3	370
Private	8.3	12	2.2	46	15.7	370
HEI location						
Urban	58.3	12	89.1	46	74.1	370
Rural	41.7	12	10.9	46	25.9	370
Estate	0.0	12	0.0	46	0.0	370
How many students are enrolled in undergraduate programs?						
Fewer than 1,000	16.7	12	—	—	—	—
1,000–2,499	8.3	12	—	—	—	—
2,500–4,999	16.7	12	—	—	—	—
5,000–9,999	41.7	12	—	—	—	—
10,000–19,999	16.7	12	—	—	—	—
20,000 or more	0.0	12	—	—	—	—
Current position						
Rector	8.3	12	—	—	—	—
Vice-chancellor	0.0	12	—	—	—	—
Dean	0.0	12	—	—	—	—
Department/Faculty chair or head registrar	8.3	12	—	—	—	—
Professor	—	—	0.0	46	—	—
Associate professor	—	—	2.2	46	—	—
Assistant professor	—	—	69.6	46	—	—
Senior lecturer	—	—	2.2	46	—	—
Lecturer	—	—	26.1	46	—	—
Full-time student	—	—	—	—	96.2	370
Other	83.3	12	0.0	46	—	—

HEI = higher education institution, — = no data available.

Table 19: Student Background Information—Pakistan

Item	Students	
	Yes (%)	Responses (no.)
Gender		
Male	6.4	234
Female	93.6	234
Nationality		
Domestic	100.0	234
Foreign	0.0	234
Current residence location		
Urban	61.1	234
Rural	37.2	234
Estate	1.7	234
Boarding near the HEI	26.1	234

continued on next page

Table 19 *continued*

Item	Students	
	Yes (%)	Responses (no.)
Housing status		
Student dormitory (on-campus)	15.8	234
With family members (relatives)	74.8	234
independent	9.4	234
Main source of funding for tuition fees and cost of living		
Scholarship (waived tuition fee)	13.2	234
Self-financed (by the family or guardian)	68.4	234
Self-financed (by the student)	10.3	234
Student loan	6.4	234
Other	1.7	234
Self-evaluated socioeconomic status		
Low (levels 1–3)	25.8	233
Lower-middle (levels 4 and 5)	36.1	233
Upper-middle (levels 6 and 7)	20.2	233
High (levels 8–10)	18.0	233
Main source of household income		
Salaries and wages (government employment)	30.8	234
Salaries and wages (private sector employment)	21.4	234
Salaries and wages (foreign employment)	2.6	234
Self-employment income (running own business)	12.4	234
Self-employment income (farming)	9.0	234
Self-employment income (casual work)	6.0	234
Charity (donations from relatives)	1.7	234
Pensions	9.8	234
Net property income (interest and other investment income received)	1.3	234
Other	5.1	234
Father's highest level of education		
At least some primary education	24.4	234
At least some secondary education	30.3	234
Completed technical and vocational education	3.4	234
At least some university/college education	32.9	234
Don't know / Not applicable	9.0	234
Mother's highest level of education		
At least some primary education	53.8	234
At least some secondary education	23.1	234
Completed technical and vocational education	3.4	234
At least some university/college education	16.7	234
Don't know / Not applicable	3.0	234

HEI = higher education institution.

Internet and Technology Access

Remote education during the COVID-19 pandemic. HEIs in Pakistan provided remote learning during the COVID-19 pandemic according to 66.7% of the administrator respondents, 88.0% of the students, and 94.1% of the teachers. The delivery method used was mostly online, 66.9% of the administrators and 61.8% of the teachers said. None of the administrator respondents mentioned the use of both online and offline learning in their HEIs, but 38.2% of the teachers and 18.0% of the students said that their HEIs used the two methods to provide remote learning.

Higher education institution support for, and promotion of, remote education. The top three areas of HEI support for remote teaching, as assessed by administrator respondents, were (i) online assessment creation (58.3%), (ii) IT support teams (50.0%), and (ii) Wi-Fi or personal computer access (41.7%). About 58.3% of administrator respondents reported having a network operations center in their HEIs. Some HEIs (50.0%) also had an on-campus multimedia production studio to support remote teaching. Of these respondents, 33.3% said that their HEIs did not have an IT support team. In HEIs where such a team exists, 10 or more team members provided IT tech support (33.3% of all administrator respondents).

The most effective measure arranged by their HEIs for remote teaching during the COVID-19 pandemic, the administrators said was provision of an online introduction to updated and varied information on remote teaching (58.3%). Updating and using the results of online course management and student achievement monitoring (33.3%) and allowing a single platform for online course management (33.3%) were other effective support measures for online teaching mentioned by the administrators. Providing guides to remote teaching, on the other hand, was not perceived by the HEIs as a priority area of support.

Concerning student learning, providing IT tech support and troubleshooting services (41.7%) ranked first among the effective types of HEI support, in the administrators' view. The administrators also mentioned other areas of effective support for remote learning (all rated 33.3%): (i) providing an online introduction to updated and varied information on remote learning and online courses; (ii) allowing a single platform for online course management; and (iii) providing workshops in online training and skills.

Teacher respondents noted the following actions taken by their universities to advance remote teaching during the COVID-19 pandemic: (i) providing teachers with guides to online teaching and learning (63.0%); (ii) acquiring videoconferencing licenses (54.3%); and (iii) mandating online teaching (50.0%). Far too few (2.2%) supported teachers with a laptop or desktop at home.

Among the various technology tools available, teachers used videoconferences the most (67.4%) to support remote teaching and learning during the pandemic. Communicating with students by mobile phone via SMS, WhatsApp, Viber, Messenger, etc., was also often used (56.5%).

Most teachers (46.9%) were required to have less than 3 hours of training to teach online courses; 15.6% of them did not receive any training before teaching online. The rest (37.5%) had to go through more than 3 hours of training with one-third of this group (12.5%) having at least 8 hours. The training provided by the HEIs dealt mostly with curriculum or instructional design and online course creation (32.6%), online assessment creation (30.4%), and online teaching pedagogies (30.4%). However, 15.2% of the teachers said that their HEIs did not train teachers to teach online.

Internet access environment. HEIs provided free on-campus internet in the case of 66.7% of the administrator respondents, 96.9% of the teachers, and 58.3% of the students. Wi-Fi (or LAN) connectivity on campus was rated *fair* or *better* in quality, reliability, and speed by 84.4% of the teachers.

Concerning digital device ownership, more than half of the teacher respondents said that they owned personal laptops (67.4%) and smartphones (58.7%). Among the student respondents, 40.5% also owned smartphones, the most commonly owned devices in this group. Overall, students were less well equipped with devices than teachers: more than 8% of the teacher respondents and only 3.2% of the students owned a tablet.

While most of the teachers (71.9%) had landline connectivity at home, students most commonly (in 69.7% of cases) relied on mobile broadband (mobile data package) access. All the teachers could access the internet at home, but about 3.0% of the students had no access. Regarding the affordability of mobile data plans and socioeconomic status, 50.7% of the students rated the plans at least *moderately affordable*; 17.0% said they were

not affordable. Mobile network quality in their area was deemed stable by most students and teachers. However, 25.0% of the teachers and 42.4% of the students noted the poor quality of their networks, and 2.7% of the students had no network coverage.

Student Engagement in Online Learning

Regarding their preferred learning environment, 59.4% of the teachers and 57.9% of the students expressed a preference for fully face-to-face learning over fully online learning or a mix of the two. Only 3.1% of the teachers and 8% of the students said that they would rather go completely online.

Online communication during the pandemic was rated *moderately effective* or *better* by more than 80.5% of the teachers. But only 37.0% of the students agreed. More than 63% of the students declared online communication only *slightly effective* at best. The fact that students were not as well equipped as teachers for good-quality communication, given their lower rate of internet access and the less powerful devices they own, may have affected their satisfaction with online communication in class.

Online student assessment and evaluation were deemed acceptable by 61.7% of the students.

More than 67.4% of the teachers primarily used WhatsApp to communicate with students during the COVID-19 pandemic. Email (41.3%), SMS (23.9%), LMS bulletin boards or messaging (13.0%), and other methods (10.9%) were also used.

Teachers need various technology tools for online teaching, including web conferencing, digital collaboration tools, video lectures, online course development, and online assessment. Most teacher respondents said they had intermediate-level proficiency in the use of web conferencing (50.0%) and digital collaboration (43.8%) technology but placed their skills at the advanced level regarding such tools as video lectures (62.5%), online course development (56.3%), and online assessment (56.3%).

Digital literacy needed for remote learning during the pandemic was placed at the novice level by 26.5% of the student respondents, at the intermediate level by 56.1%, and at the advanced level by 17.4%. Also, 76.9% of the students said their teachers had good (or better) knowledge or expertise in the use of online learning tools during the pandemic, 48.9% were assessed as *good*, and 28.0% as *very good*. Only 2.7% of the students held the view that the teachers had poor knowledge or expertise in the use of online learning.

Student online learning experiences cover class preparation, instructor lectures, use of class materials, laboratory simulations, team projects, assignments, assessments, and feedback. The student respondents, when asked to assess their level of adaptation to remote learning, declared it to be at the adapted level (moderately adapted or very well adapted) in most cases: class preparation (51.9%), instructor lectures (63.7%), use of class materials (67.0%), laboratory simulations (29.9%), team projects (45.8%), assignments (70.6%), assessments (59.6%), and feedback (48.9%).

In levels of student attainment through remote learning, 34 teachers rated the following *very high* or *moderately high*: learning motivation (35.3%), major knowledge and skills (50.0%), collaborative learning experience (50.0%), and learning engagement (38.2%). They gave similar ratings to the student learning gap (41.2%) and learning burden (55.9%). Students, on the other hand, gave *very high* or *moderately high* ratings to learning motivation (45.0%), major knowledge and skills (53.7%), collaborative learning experience (49.5%), and learning engagement (53.8%), as well as to student interaction with classmates (46.4%) and interaction with professors (51.4%).

The overall remote learning experience during the COVID-19 pandemic, in the students' view, was *satisfactory*, or even *very satisfactory* (70.8%).

Engagement of Low-Income Students in Online Learning

The study analyzed the effectiveness of the use of online communication tools, level of digital literacy, satisfaction with the overall remote learning experience, obstacles or problems in remote learning, and online and on-campus learning experiences during the COVID-19 pandemic according to the students' perceived socioeconomic status (including those from poor families with very little or no education and working in low-paying jobs, to students from wealthy, highly educated families holding high-paying jobs).

The use of online communication tools was rated *extremely effective* by 6.7% of low-income students, and by 7.1% of students from the lower-middle-income, 10.6% from the upper-middle-income, and 21.4% from the high-income groups. On the other hand, 38.3% of low-income students declared the use of the tools *completely ineffective*, as did 21.4% of lower-middle-income, 12.8% of upper-middle-income, and 19.0% of high-income students.

The level of digital literacy was placed at the advanced level by 10.0% of low-income, 20.2% of lower-middle-income, 21.3% of upper-middle-income, and 16.7% of high-income students. However, 35.0% of low-income, 23.8% of lower-middle-income, 10.6% of upper-middle-income, and 28.6% of high-income students said they had only novice-level digital literacy.

Satisfaction with the overall remote learning experience was very high among 31.7% of low-income, 15.5% of lower-middle-income, 8.5% of upper-middle-income, and 23.8% of high-income students. But the experience was considered highly unsatisfactory by 15.0% of low-income, 3.2% of lower-middle-income, 0.0% of upper-middle-income, and 14.3% of high-income students.

Regarding obstacles or problems in remote learning, poor internet connection was the most frequently mentioned by students from all socioeconomic groups: 53.5% of low-income, 65.5% of lower-middle-income, 53.2% of upper-middle-income, and 52.4% of high-income students. Other difficulty ratings differed between socioeconomic groups. For instance, while only 1.2% of low-income and 25.0% of lower-middle-income students cited difficulties in online assessment and exams, these problems were acknowledged by 36.2% of upper-middle-income and 23.8% of high-income students. Likewise, only 13.3% of low-income students—compared with 38.3% of upper-middle-income and 19.0% of high-income students—said that they experienced fatigue, boredom, and stress from continuous screen viewing. In some cases, the difficulty ratings from the lowest-income group were almost double those from the highest-income group. For instance, only 16.7% of high-income students said that access to technology and devices was a problem, but 31.7% of low-income students admitted to difficulties in this regard.

In a comparison between online and on-campus lectures, students from the upper-middle-income group made up the largest proportion of those who favored on-campus lectures (76.6%), followed by high-income (71.4%) and lower-middle-income (70.2%) students. In all groups, most students preferred on-campus lectures. No preference was expressed by 16%–19% of all student respondents.

Motivation for online learning was rated *very low* or *moderately low* by 53.4% of low-income students, and *moderately high* or *very high* by 46.6%. High-income students (52.8%) gave it *very low* or *moderately low* ratings, and 47.2% rated it *moderately high* or *very high*.

Major knowledge gained through online learning scored *very low* or *moderately low* among 40.0% of low-income students, and *moderately high* or *very high* among 60.0%. Ratings of *very low* or *moderately low* were obtained from 44.0% of high-income students, and *moderately high* or *very high* from 56.0%.

Ratings for online collaborative learning from low-income students were *very low* or *moderately low* from 43.9%, and *moderately high* or *very high* from 56.1%. High-income students gave it *very low* or *moderately low* ratings in 41.4% of cases, and *moderately high* or *very high* ratings in 58.5%.

Online learning engagement was rated *very low* or *somewhat low* by 43.9% of low-income students, and *somewhat high* or *very high* by 56.1%. Among high-income students, 36.6% rated it *very low* or *moderately low*, and 63.4%, *moderately high* or *very high*.

Challenges and Issues

Regarding major sources of funding for online learning, 16.7% of administrator respondents received no funding for online learning. Among those who did receive funding, 25.0% (the highest proportion of online funding recipients among these respondents) said that the funding came from the government.

The top three challenges of online teaching mentioned by teacher respondents were (i) limited student access to devices (45.7%); (ii) poor internet connectivity in the university (30.4%); and (iii) lack of incentives for online teaching (28.3%).

The top three disadvantages of online teaching and learning, according to the teacher respondents, were (i) challenging student engagement (58.7%); (ii) need for technology devices and reliable internet access (54.3%); and (iii) unmotivated, often distracted students (54.3%).

The main challenge or obstacle in the deployment of remote learning (online and/or offline) experienced by 58.3% of administrator respondents pertained to budget insufficiency to pay for university staff or faculty salaries.

Faculty respondents said that the top three challenges or obstacles were (i) poor internet connection (63.0%); (ii) difficulties in assessing student performance (60.9%); and (iii) poor engagement with students (58.7%).

The top three challenges or obstacles according to the student respondents were (i) poor internet connection (41.9%); (ii) difficulties in online assessments and exams (18.1%); and (iii) fatigue, boredom, and stress from continuous screen viewing (17.6%).

Philippines

Demographic Information

Higher education institution background information. The student respondents from the Philippines included in the survey were mostly enrolled in private HEIs (61.1%) and were full-time students (91.7%). For each of the three respondent groups, more than 80.0% of the HEIs represented were in the urban areas. Among the administrator respondents, HEI deans made up the largest proportion (29.5%), excluding those in "other" positions, and undergraduate programs with fewer than 1,000 enrolled students had the largest share of such programs (25.6%). Among the teacher respondents, lecturers accounted for the highest percentage (28.9%) (Table 20).

Table 20: Higher Education Institution Background Information (All Responses)—Philippines

Item	HEI Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Public or private HEI						
Public	15.4	78	14.9	505	38.9	3,532
Private	84.6	78	85.1	505	61.1	3,532
HEIs' location						
Urban	83.3	78	84.6	505	81.1	3,532
Suburban	11.5	78	9.7	505	9.9	3,532
Rural	5.1	78	5.7	505	9.0	3,532
How many students are enrolled in undergraduate programs?						
Fewer than 1,000	25.6	78	—	—	—	—
1,000–2,499	15.4	78	—	—	—	—
2,500–4,999	17.9	78	—	—	—	—
5,000–9,999	23.1	78	—	—	—	—
10,000–19,999	7.7	78	—	—	—	—
20,000 or more	10.3	78	—	—	—	—
Current position						
Rector	1.3	78	—	—	—	—
Vice-chancellor	5.1	78	—	—	—	—
Dean	29.5	78	—	—	—	—
Department/Faculty chair or head registrar	23.1	78	—	—	—	—
Professor	—	—	22.0	505	—	—
Associate professor	—	—	12.9	505	—	—
Assistant professor	—	—	17.6	505	—	—
Senior lecturer	—	—	3.2	505	—	—
Lecturer	—	—	28.9	505	—	—
Full-time student	—	—	—	—	91.7	3,532
Other	41.0	78	15.4	505	—	—

HEI = higher education institution, — = no data available.

Student background information. The student respondents were mostly female (64.4%) and were primarily composed of domestic students (57.8%). Most lived in urban areas (60.2%), and 40.3% were staying near their HEIs. Family members (relatives) provided housing support to 81.2% of the student respondents, and the family or guardian provided financial assistance to 72.7% for their tuition fees and living expenses. Regarding their socioeconomic status, 42.8% of these respondents (the highest proportion) placed themselves in the upper-middle-class group (levels 6 and 7). Salaries and wages (private sector employment) were the main sources of household income for the largest group of student respondents (22.5%). In most cases, the fathers of the student respondents (41.5%), as well as their mothers (45.3%), had at least some university or college education (Table 21).

Table 21: Student Background Information—Philippines

Item	Students	
	Yes (%)	Responses (no.)
Gender		
Male	35.6	3,532
Female	64.4	3,532
Nationality		
Domestic	57.8	3,532
Foreign	42.2	3,532
Current residence location		
Urban	60.2	3,532
Suburban	14.9	3,532
Rural	24.0	3,532
Estate	0.9	3,532
Boarding near the HEI	40.3	3,532
Housing status		
Student dormitory (on campus)	7.8	3,532
With family members (relatives)	81.2	3,532
Independent	11.0	3,532
Main source of funding for tuition fees and cost of living		
Scholarship (waived tuition fee)	16.0	3,532
Self-financed (by the family or guardian)	72.7	3,532
Self-financed (by the student)	7.3	3,532
Student loan	2.8	3,532
Other	1.2	3,532
Self-evaluated socioeconomic status		
Low (levels 1–3)	6.1	3,523
Lower-middle (levels 4 and 5)	37.6	3,523
Upper-middle (levels 6 and 7)	42.8	3,523
High (levels 8–10)	13.5	3,523
Main source of household income		
Salaries and wages (government employment)	20.9	3,532
Salaries and wages (private sector employment)	22.5	3,532
Salaries and wages (foreign employment)	10.3	3,532
Self-employment income (running own business)	14.4	3,532
Self-employment income (farming)	11.0	3,532
Self-employment income (casual work)	14.8	3,532
Charity (donations from relations)	0.7	3,532
Pensions	2.5	3,532
Net property income (interest and other investment income received)	1.3	3,532
Other	1.6	3,532
Father's highest level of education		
At least some primary education	12.9	3,532
At least some secondary education	26.6	3,532
Completed technical and vocational education	9.5	3,532
At least some university/college education	41.1	3,532
Don't know / Not applicable	9.9	3,532
Mother's highest level of education		
At least some primary education	12.3	3,532
At least some secondary education	29.5	3,532
Completed technical and vocational education	8.0	3,532
At least some university/college education	45.3	3,532
Don't know / Not applicable	4.9	3,532

HEI = higher education institution.

Internet and Technology Access

Remote education during the COVID-19 pandemic. HEIs represented by more than 96.0% of the teacher and student respondents from the Philippines were providing remote learning during the COVID-19 pandemic. The delivery method most commonly used was online learning, according to 62.8% of the administrator respondents and 60.2% of the teachers. However, 34.6% of the administrator respondents and 39.2% of the teacher respondents employed both online and offline learning. Among the student respondents, online learning was most often used by 79.1%.

Higher education institution support for, and promotion of, remote education. The three support measures most often provided to teachers by HEIs were (i) professional development in remote teaching strategies (74.4%), (ii) instructional design and online course creation (71.8%), and (iii) IT support teams (61.5%). In 3.9% of the HEIs represented, however, teachers received no support.

Fifty percent of the HEIs had an on-campus multimedia production studio to support remote teaching. About 80.8% of the administrator respondents also said that their HEIs had a network operations center. These centers had five IT support team members or fewer in 53.9% of the HEIs represented, 6–10 team members in 28.2%, and more than 10 team members in 10.3%. However, 3.9% of the HEIs did not have an IT support team on campus.

The three most effective teacher support measures, according to the administrator respondents, were (i) workshops in online training and skills (84.6%), (ii) online introduction to updated and varied information on remote teaching (71.8%), and (iii) IT tech support and troubleshooting services (65.4%).

The three most effective HEI support measures for students, in the administrators' view, were (i) workshops in online training and skills (70.5%), (ii) use and enhancement of online interaction functions (60.3%), and (iii) online introduction to updated and varied information on remote learning and online courses (59.0%).

Internet access environment. Among the groups of respondents, 92.3% of the administrators, 81.8% of the teachers, and 65.7% of the students said that their HEIs provided free internet on campus. Wi-Fi (or LAN) connectivity, in terms of quality, reliability, and speed, was rated *fair* or *better* by 91.5% of the teacher respondents.

Teachers and students who answered the question about digital device ownership were highly equipped with laptops (96.6% of teachers; 71.7% of students) and smartphones (88.1% of teachers; 83.7% of students). Tablets were much less common (only 28.7% of teacher respondents and 12.1% of student respondents owned one). Students generally had a lower digital device ownership rate than teachers, but their digital device retention rate was higher.

At home, most student respondents had mobile broadband (mobile data package) internet access (28.0%) or landline connectivity (71.0%). Mobile data plans were declared affordable by 95.6% of the student respondents, and unaffordable by 4.4%. Mobile network quality was at least good and stable, according to 85.8% of the teachers and 69.6% of students reported that the quality of mobile network was 'Excellent and Stable' and 'Good and Stable'.

Student Engagement in Online Learning

Adaptation to remote education and professor–student interaction. Regarding their preferred learning environment, 41.4% of the teacher respondents said that they preferred a 50:50 combination of online and face-to-face learning. Completely face-to-face learning was favored by 23.6%, but only 3.2% of the teachers would rather go completely online. Among the student respondents, 36.4% expressed a preference for completely face-to-face learning, and 36.0%, for the combined learning environment. Only 3.4% of the students preferred completely online learning.

The use of online communication tools in communicating with students during the COVID-19 pandemic was rated *extremely effective* by 22.0% of the teacher respondents, and *moderately effective* by 63.2%. Among the student respondents, only 8.2% gave the use of online communication tools an *extremely effective* rating, and 45.0% declared the use of these tools *moderately effective*.

Online student assessment and evaluation were pronounced acceptable by 83.1% of the student respondents.

To communicate with students during the COVID-19 pandemic, 82.0% of the teacher respondents primarily used Facebook Messenger. The teachers also used email (81.4%) and LMS bulletin boards or messaging (54.5%).

Teachers need various technology tools for online teaching. Most of the teacher respondents declared their intermediate-level proficiency in the use of the following technology tools: web conferencing (50.7%), digital collaboration tools (54.7%), video lectures (49.3%), online course development (52.7%), and online assessment (50.7%).

Asked to rate their digital literacy for remote learning during the COVID-19 pandemic, 16.7% of the student respondents placed it at the novice level, 70.3% at the intermediate level, and 13.0% at the advanced level. The students also rated their teachers' knowledge or expertise in using online learning tools during the pandemic. The majority gave *good* (53.5%) or *very good* (27.7%) ratings. Only 1.9% said that their teachers had *poor* knowledge or expertise in the use of online learning.

The students, in most cases, rated their level of adaptation to the following online learning experiences as *moderately adapted* or *very well adapted*: class preparation (80.2%), instructor lectures (80.7%), use of class materials (80.7%), laboratory simulations (51.5%), team projects (68.7%), assignments (84.1%), assessments (82.4%), and feedback (73.6%).

In levels of student attainment through remote learning, the teacher respondents, in most cases, assigned *very high* or *moderately high* ratings to learning motivation (60.2%), major knowledge and skills (72.5%), collaborative learning experience (62.4%), and learning engagement (60.4%). A large number of these respondents also gave *very high* or *moderately high* ratings to the student learning gap (46.8%) and learning burden (56.6%). The student respondents rated the following *very high* or *moderately high*: learning motivation (53.1%), major knowledge and skills (59.4%), collaborative learning experience (58.9%), and learning engagement (59.6%). They gave similar ratings to student interaction with classmates (52.3%) and interaction with professors (54.5%).

The overall remote learning experience during the COVID-19 pandemic was deemed *satisfactory*, or even *very satisfactory*, by 83.2% of the student respondents.

Online Learning Engagement of Low-Income Students

The study grouped student respondents according to their perceived socioeconomic status ("1" for those from poor families with very little or no education and working in low-paying jobs to "10" for students from wealthy, highly educated families holding high-paying jobs), and asked them to rate the effectiveness of the use of online communication tools, their level of digital literacy, their satisfaction with the remote learning experience, obstacles or problems they have encountered in remote learning, and their online and on-campus learning experiences during the COVID-19 pandemic.

The use of online communication tools was rated *extremely effective* by 8.3% of low-income, 6.1% of lower-middle-income, 8.4% of upper-middle-income, and 13.1% of high-income students. However, 13.4% of

low-income, 9.1% of lower-middle-income, 6.1% of upper-middle-income, and 7.8% of high-income students said it was *not effective at all*.

Regarding their level of digital literacy, 8.8% of low-income, 10.3% of lower-middle-income, 14.2% of upper-middle-income, and 18.7% of high-income students placed it at the advanced level. However, 27.8% of low-income, 19.1% of lower-middle-income, 12.6% of upper-middle-income, and 17.3% of high-income students said they had only novice-level digital literacy.

Regarding satisfaction with the overall remote learning experience, 13.4% of low-income, 11.5% of lower-middle-income, 11.5% of upper-middle-income, and 21.1% of high-income students declared themselves very satisfied. On the other hand, dissatisfaction was at a very high level among 3.7% of low-income, 3.5% of lower-middle-income, 2.2% of upper-middle-income, and 4.0% of high-income students.

Asked about obstacles or problems in remote learning, the student respondents singled out the following difficulties related to technology access and use: (i) no access to technology devices (33.3% of low-income, 24.6% of lower-middle-income, 18.2% of upper-middle-income, and 20.4% of high-income students); (ii) no internet connection (28.7% of low-income, 27.2% of lower-middle-income, 22.1% of upper-middle-income, and 22.5% of high-income students); (iii) poor internet connection (75.9% of low-income, 80.8% of lower-middle-income, 81.4% of upper-middle-income, and 72.2% of high-income students); and (iv) fatigue, boredom and stress from continuous screen viewing (47.2% of low-income, 55.6% of lower-middle-income, 61.9% of upper-middle-income, and 56.0% of high-income students).

Other remote learning obstacles or problems cited by the students were (i) maintenance of teacher–student interaction (31.5% of low-income, 28.0% of lower-middle-income, 29.2% of upper-middle-income, and 33.5% of high-income students) and (ii) difficulties in online assessments and exams (42.6% of low-income, 35.6% of lower-middle-income, 38.2% of upper-middle-income, and 33.7% of high-income students).

In a comparison between online and on-campus lectures: (i) on-campus lectures were rated higher by 48.2% of lower-middle-income, 57.9% of lower-middle-income, 64.1% of upper-middle-income, and 57.5% of high-income students; (ii) online lectures received higher ratings from 16.7% of lower-middle-income, 10.8% of lower-middle-income, 8.2% of upper-middle-income, and 12.4% of high-income students; and (iii) no preference was expressed by 25.9% of lower-middle-income, 23.9% of lower-middle-income, 23.0% of upper-middle-income, and 23.2% of high-income students.

In levels of attainment achieved through remote learning, learning motivation scored *very low* or *moderately low* among 57.4% of low-income students, and *moderately high* or *very high* among 42.2%. Among high-income student respondents, on the other hand, 35.2% rated learning motivation *very low* or *moderately low*, and 64.4%, *moderately high* or *very high*.

Major knowledge received *very low* or *moderately low* ratings from 50.9% of low-income students and *moderately high* or *very high* ratings from 49.1%. In the high-income student group, 31.0% gave it *very low* or *moderately low* ratings, and 68.7% rated it *moderately high* or *very high*.

Collaborative learning experience was rated *very low* or *moderately low* by 52.4% of low-income students, and *moderately high* or *very high* by 47.7%. *Very low* or *moderately low* scores were obtained from 30.3% of high-income students, and *moderately high* or *very high* ratings from 69.3%.

In the low-income group, learning engagement scored *very low* or *moderately low* among 49.1%, and *moderately high* or *very high* among 50.9%. In the high-income group, *very low* or *moderately low* scores were given by 33.9%, and *moderately high* or *very high* scores by 65.5%.

Challenges and Issues

Major sources of funding for online learning, according to the administrator respondents, were the HEIs themselves (66.7%), the government (3.9%), and private sector or nonprofit organizations (1.3%).

The top three challenges cited by the teacher respondents were (i) limited student access to devices (60.4%), (ii) lack of incentives for online teaching (52.7%), and (iii) poor or no internet access for teachers and students (44.4%).

The top three disadvantages of online teaching and learning mentioned by the teacher respondents were (i) the need for technology devices and reliable internet access (86.9%); (ii) unmotivated, often distracted students (83.8%); and (iii) challenging student engagement (83.6%).

The top three challenges or obstacles to the deployment of remote learning (online and/or offline) mentioned by the administrator respondents were (i) limited or no access to the internet and devices among students (88.5%); (ii) university bandwidth issues, poor internet connectivity (52.6%); and (iii) lack of teacher know-how in remote teaching and learning (61.5%).

For the teacher respondents, the main challenges or obstacles were (i) poor internet connection (85.5%), (ii) difficulties in assessing student performance (64.2%), and (iii) poor engagement with students (68.9%).

For the student respondents, the main challenges or obstacles were (i) poor internet connection (79.6%); (ii) fatigue, boredom, and stress from continuous screen viewing (57.8%); and (iii) difficulties in online assessments and exams (36.8%).

Republic of Korea

Demographic Information

Most of the students surveyed in the Republic of Korea (70.4%) were enrolled in public HEIs; most were full-time students (88.6%). In this respondent group, as well as among administrator respondents, most HEIs were in estate areas (93.9% for the students; 70.8% for the administrators). Among the teachers surveyed, most HEIs (88.5%) were in urban areas. Undergraduate programs with more than 20,000 students made up the largest number (37.5%) of such programs in the HEIs represented by the administrators. Department or faculty chairs or head registrars accounted for the highest number of administrators (37.5%), and lecturers accounted for the highest number of teacher respondents (39.7%) (Table 22).

Table 22: Higher Education Institution Background Information (All Responses)—Republic of Korea

Item	HEI Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Public or private HEI						
Public	62.5	24	75.6	78	70.4	507
Private	37.5	24	24.4	78	29.6	507
HEI location						
Urban	4.2	24	88.5	78	0.4	507
Rural	25.0	24	10.3	78	5.7	507
Estate	70.8	24	1.3	78	93.9	507
How many students are enrolled in undergraduate programs?						
Fewer than 1,000	8.3	24	—	—	—	—
1,000–2,499	8.3	24	—	—	—	—
2,500–4,999	12.5	24	—	—	—	—
5,000–9,999	8.3	24	—	—	—	—
10,000–19,999	25.0	24	—	—	—	—
20,000 or more	37.5	24	—	—	—	—
Current position						
Rector	0.0	24	—	—	—	—
Vice-chancellor	0.0	24	—	—	—	—
Dean	4.2	24	—	—	—	—
Department/Faculty chair or head registrar	37.5	24	—	—	—	—
Professor	—	—	19.2	78	—	—
Associate professor	—	—	14.1	78	—	—
Assistant professor	—	—	25.6	78	—	—
Senior lecturer	—	—	0.0	78	—	—
Lecturer	—	—	39.7	78	—	—
Full-time student	—	—	—	—	88.6	507
Other	58.3	24	1.3	78	—	—

HEI = higher education institution, — = no data available.

Student background information. The student respondents were mostly female (60.9%). Domestic students composed 95.7% of the total. Most students were living in estate areas (88.0%); 66.9% were staying near their HEIs. Family members (relatives) provided housing support to 47.1% of the student respondents, and the family or guardian provided financial support to 53.6% for tuition fees and living expenses. The highest number of students (41.2%) evaluated their socioeconomic status as upper-middle class (levels 6 and 7). Salaries and wages (private sector employment) were the main sources of household income for the greatest number of student respondents (45.6%). Both fathers (62.1%) and mothers (55.8%) of most students had at least some university or college education (Table 23).

Internet and Technology Access

Remote education during the COVID-19 pandemic. More than 97% of HEIs in the Republic of Korea, the students said, provided remote learning during the pandemic. The delivery method most used was online learning, according to 66.7% of the administrator respondents and 60.3% of the teachers. In 39.7% of HEIs represented by the teacher respondents, learning took place mostly offline, and in 29.2% of the administrators' HEIs, both online and offline modes were used. Among the students, 70.2% learned mostly online.

Table 23: Student Background Information—Republic of Korea

Items	Students	
	Yes (%)	Responses (no.)
Gender		
Male	39.1	507
Female	60.9	507
Nationality		
Domestic	95.7	507
Foreign	4.3	507
Current residence location		
Urban	2.8	507
Rural	9.3	507
Estate	88.0	507
Boarding near the higher education institution	66.9	
Housing status		
Student dormitory (on campus)	22.3	507
With family members (relatives)	47.1	507
Independent	30.6	507
Main source of funding for tuition fees and cost of living		
Scholarship (waived tuition fee)	28.6	507
Self-financed (by the family or guardian)	53.6	507
Self-financed (by the student)	13.4	507
Student loan	3.2	507
Other	1.2	507
Self-evaluated socioeconomic status		
Low (levels 1–3)	11.4	507
Lower-middle (levels 4 and 5)	28.8	507
Upper-middle (levels 6 and 7)	41.2	507
High (levels 8–10)	18.5	507
Main source of household income		
Salaries and wages (government employment)	21.9	507
Salaries and wages (private sector employment)	45.6	507
Salaries and wages (foreign employment)	1.0	507
Self-employment income (running own business)	22.9	507
Self-employment income (farming)	2.0	507
Self-employment income (casual work)	1.8	507
Charity (donations from relatives)	0.0	507
Pensions	2.0	507
Net property income (interest and other investment income received)	1.4	507
Other	1.6	507
Father's highest level of education		
At least some primary education	2.2	507
At least some secondary education	8.9	507
Completed technical and vocational education	17.2	507
At least some university/college education	62.1	507
Don't know / Not applicable	9.7	507
Mother's highest level of education		
At least some primary education	1.2	507
At least some secondary education	14.6	507
Completed technical and vocational education	18.5	507
At least some university/college education	55.8	507
Don't know / Not applicable	9.9	507

Higher education institution support for, and promotion of, remote education. HEI support for remote teaching most commonly involved the following, according to the administrators: (i) multimedia content creation (video lectures) (66.7%); (ii) IT support teams (58.3%); and (iii) professional development in remote teaching strategies, and instructional design and online course creation (both 54.2%).

About 75.0% of the administrator respondents said that their HEIs had a network operations center to support remote teaching. The centers most often had an IT support team with more than 10 members (42.9% of the total). A slightly smaller number (38.1%) had five or fewer members in their IT support team, and 14.3% had 6–10 IT support team members. For 4.8% of the administrators, their HEIs did not have an IT support team on campus.

An on-campus multimedia production studio also supported remote teaching in 89.5% of the administrators' HEIs.

Among the support measures provided by HEIs for remote teaching during COVID-19, the three most effective, in the administrators' view, were (i) workshops in online training and skills (62.5%), (ii) guides to remote teaching (54.2%), and (iii) online introduction to updated and varied information on remote teaching (45.8%).

For the students, the most effective measures provided by their HEIs, according to the administrators, were (i) authority to use a single platform for online course management (41.7%); (ii) online training and skills workshops, as well as enhanced online interaction functions (both 37.5%); and (iii) guides to remote learning, and online introduction to updated and varied information on remote learning and online courses (both 33.3%).

According to the teachers, the most effective actions taken by their HEIs to advance remote teaching during the pandemic were providing teachers with guides to online teaching and learning (92.3%) and acquiring videoconferencing licenses (89.7%). The least effective, the teachers said, was HEI support for teachers' laptop or desktop needs at home (9.0%).

The technological tools most used by the teacher respondents for remote teaching during the COVID-19 pandemic were videoconferencing (89.7%) and uploading course materials through LMS (84.6%).

More than half of the teachers (51.3%) did not have to receive training to teach online. Close to 40.0% had to take no more than 4 hours of training.

At least 50.0% of the teacher respondents said that their HEIs provided training in online teaching pedagogies (97.4%), multimedia content creation (67.9%), blended learning techniques and models (50.0%), and curriculum and instructional design and online course creation (50.0%). Training in online assessment creation, a common area of difficulty in online teaching, was available in only 17.9% of the HEIs represented.

Internet access environment. Most HEIs provided free internet on campus, according to 95.8% of the administrator respondents, 93.6% of the teachers, and 97.0% of the students. The quality, reliability, and speed of the Wi-Fi (or LAN) connectivity were rated at least *fair* by 93.5 % of the teacher respondents.

The most commonly owned digital devices were laptops among the teachers (96.2%), and smartphones among the students (95.3%). Teachers were also highly equipped with smartphones (91.0%), while tablets were less common in this respondent group (65.4%). Most students also had laptops (90.7%) but were less well-equipped with tablets (63.9%) and desktop computers (41.8%). The student device ownership rate was generally lower than that of the teachers, but their device retention rate was higher.

Most students had mobile broadband (mobile data package) (47.9%) and landline (51.5%) connectivity at home. Mobile data plans were rated *affordable* by 91.9% of the student respondents. Mobile network quality was at least good and stable, according to 92.3% of the teachers and 89.5% of the students.

Student Engagement in Online Learning

The learning environment preferred by the highest number of teacher respondents (42.3%) was 50.0% online and 50.0% face-to-face learning. Only 1.3% of the teachers preferred to teach completely online, and 20.5% would rather have completely face-to-face learning. Among the students, 25.8% preferred a learning environment that is mostly, but not completely, online; 18.1% expressed a preference for completely online learning, and 13.8% preferred entirely face-to-face learning.

In the case of online communication during the pandemic, more than 67.9% of the teacher respondents declared it moderately effective or better. But only 43.2% of the students agreed. More than 56.0% of the students said that online communication was only slightly effective at best. The fact that the students were generally less well-equipped than the teachers for good-quality communication may have affected their satisfaction with online communication in class.

Online student assessment and evaluation were acceptable to 80.0% of the students.

To communicate with students during the COVID-19 pandemic, more than 76.9% of the teacher respondents primarily used LMS bulletin boards or messaging. They also used email (61.5%) and SMS (47.4%). Almost 14% of the teachers said that they used "other" tools as well to communicate.

Teachers need various technology tools for online teaching. Their level of proficiency in the use of the following online teaching tools was rated *intermediate* by the largest number of teacher respondents: digital collaboration tools (55.1%), online course development (44.9%), and online assessment (42.3%). They claimed *advanced-level* proficiency in the use of web conferencing (50.0%) and video lectures (52.6%).

Digital literacy needed for remote classes during the COVID-19 pandemic was placed at the *intermediate* level by most of the student respondents (59.8%); 32.1% rated their digital literacy level *advanced*, and 8.1% *novice*. Teacher knowledge or expertise in using online learning tools during the COVID-19 pandemic was pronounced *good* or *better* by 70.0% of the students. Only 10.9% of the students said that their teachers had poor knowledge or expertise in the use of online learning.

Level of adaptation to the various remote learning experiences were rated *moderately adapted* or *very well adapted* by most of the student respondents: class preparation (86.6%), instructors' lectures (85.2%), use of class materials (88.8%), laboratory simulations (54.0%), team projects (52.6%), assignments (86.6%), assessments (79.1%), and feedback (72.6%).

The teacher respondents gave *very high* or *moderately high* ratings to the level of student attainment through remote learning in the following areas: learning motivation (27.3%), major knowledge and skills (49.3%), collaborative learning experience (19.2%), and learning engagement (37.7%). They gave similar ratings to the student learning gap (54.6%) and learning burden (41.6%). The students, on the other hand, rated the following *very high* or *moderately high*: learning motivation (50.5%), major knowledge and skills (65.9%), collaborative learning experience (39.1%), and learning engagement (53.8%). The students had similar ratings for their interaction with classmates (24.9%) and interaction with teachers (38.9%).

The overall remote learning experience during the COVID-19 pandemic was declared *moderately satisfactory* or *better* by 86.0% of the student respondents.

Online Learning Engagement of Low-Income Students

Effectiveness of using online communication tools, level of digital literacy, satisfaction with the remote learning experience, obstacles or problems encountered in remote learning, and online versus on-campus learning experiences during the COVID-19 pandemic were rated by the student respondents, grouped according to their self-perceived socioeconomic status ("1" students coming from poor families with very little or no education and working in low-paying jobs to "10" students from wealthy, highly educated families holding high-paying jobs).

The use of online communication tools was rated *extremely effective* by 13.6% of low-income, 32.1% of lower-middle-income, 34.6% of upper-middle-income, and 19.8% of high-income students. However, 11.5% of students from the low-income group said it was *completely ineffective*, as did 41.0% of lower-middle-income, 32.8% of upper-middle-income, and 14.8% of high-income students.

Their digital literacy was at the advanced level, according to 9.2% of low-income, 27.0% of lower-middle-income, 39.3% of upper-middle-income, and 24.5% of high-income students. Those from this respondent group who rated their digital literacy no higher than the novice level made up 31.7% of low-income, 24.4% of lower-middle-income, 36.6% of upper-middle-income, and 7.3% of high-income students.

The overall remote learning experience was pronounced very satisfactory by 14.5% of low-income, 29.1% of lower-middle-income, 35.9% of upper-middle-income, and 20.5% of high-income students. However, 5.9% of low-income, 29.4% of lower-middle-income, 52.9% of upper-middle-income, and 11.8% of high-income students said they were very dissatisfied with the experience.

Among the obstacles or problems encountered in remote learning, a lack of access to technology devices was cited by a relatively high proportion of students in the low-income and upper-middle-income groups; no internet connection, by a large number in the upper-middle-income group; and the maintenance of teacher–student interaction, by many lower-middle-income and upper-middle-income students. In most cases, the difficulties mentioned differed in extent between socioeconomic groups. The proportion of students with no internet connection was highest in the upper-middle-income group (42.2%) and lowest in the low-income group (11.2%). Students with no access to technology devices were highest in number in the upper-middle-income group (44.4%), followed by the low-income group (20.6%) and the lower-middle and high-income groups (17.5%). Perceptions of difficulties in online assessments and exams and in the maintenance of teacher–student interaction also differed significantly between students in the low-income and upper-middle-income groups. However, the findings should be viewed with caution because the survey questions were designed for DMCs.

Fatigue, boredom, and stress from continuous screen viewing; maintenance of teacher–student interaction; and difficulties in online assessments and exams were not mentioned as obstacles or problems by most low-income students but presented problems for other income groups. For instance, fatigue, boredom, and stress from continuous screen viewing were cited by 28.2% of the lower-middle income group, 42.4% of the upper-middle-income group, and 19.1% of the high-income group, compared with only 10.3% from the low-income group.

In a comparison between online and on-campus lectures, the highest proportion of students who said that on-campus lectures were better came from the upper-middle-income group (44.1%). The next highest was the lower-middle-income group (30.3%). The highest proportion of students who said that online lectures were better also came from the upper-middle-income (38.5%) and lower-middle-income (31.7%) groups. In the upper-middle-income group, students who stated that on-campus lectures were better (44.1%) nearly equaled the number of students who said that neither option was preferable (45.2%).

In levels of student attainment achieved through remote learning, learning motivation scored *very low* or *somewhat low* among 27.6% of low-income students, and *moderately high* or *very high* among 23.4%. In the high-income group, it was rated *very low* or *somewhat low* by 26.6%, and *moderately high* or *very high* by 48.7%.

Major knowledge received *very low* or *somewhat low* ratings from 28.9% of low-income students, and *moderately high* or *very high* from 23.0%. High-income students rated it *very low* or *moderately low* in 26.4% of cases, and *moderately high* or *very high* in 48.2%.

Collaborative learning experience scored *very low* or *moderately low* among 21.0% of low-income students, and *moderately high* or *very high* among 21.6%. High-income students gave it *very low* or *moderately low* ratings (30.8%), and *moderately high* or *very high* (52.1%).

Very low or *moderately low* ratings were given to learning engagement by 26.2% of low-income students, and *moderately high* or *very high* ratings by 25.4%. The high-income student group rated it *very low* or *moderately low* (32.0%), and *moderately high* or *very high* (46.9%).

Challenges and Issues

Funding for online learning comes mostly from the government, according to 63.2% of the administrator respondents.

The top three challenges of online teaching, the teacher respondents said, were (i) limited knowledge and training in online teaching (42.3%), (ii) lack of incentives for online teaching (41.0%), and (iii) limited IT technical support (33.3%).

The teachers cited the following top three disadvantages of online teaching and learning: (i) challenging student engagement (80.8%); (ii) unmotivated, often distracted students (79.5%); and (iii) lack of social interaction (64.1%).

The administrator respondents named their top three challenges or obstacles in the deployment of remote learning (online and/or offline) during COVID-19 as (i) lack of teacher know-how in remote teaching and learning (70.8%), (ii) insufficient university budget for online infrastructure (66.7%), and (iii) limited or no access to the internet and devices (50.0%).

The top three challenges or obstacles, according to the teacher respondents, were (i) poor engagement with students (71.8%), (ii) difficulties experienced in assessing student performance (69.2%), and (iii) lack of training in the use of technology tools (41.0%).

For the student respondents, the main challenges or obstacles in the deployment of remote learning (online and/or offline) during the pandemic were (i) poor internet connection (68.6%); (ii) fatigue, boredom, and stress from continuous screen viewing (65.1%); and (iii) maintenance of teacher–student interaction (54.4%).

Viet Nam

Demographic Information

Most of the student respondents from Viet Nam (93.6%) were enrolled in public HEIs; most (99.1%) were enrolled full-time. Among the HEIs at each respondent level, more than 80.0% were in the urban areas. Undergraduate programs in the largest number of HEIs (25.0% of all HEIs represented by the administrator respondents) had 2,500–4,999 enrolled students. Department or faculty chairs or head registrars made up the highest number of administrator respondents (31.1%), and the highest number of teacher respondents occupied lecturer positions (89.4%) (Table 24).

Table 24: Higher Education Institution Background Information (All Responses)—Viet Nam

Item	HEI Administrators		Faculty		Students	
	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)	Yes (%)	Responses (no.)
Public or private HEI						
Public	92.0	528	93.0	1,897	93.6	61,083
Private	8.0	528	7.0	1,897	6.4	61,083
HEI location						
Urban	80.5	528	88.2	1,897	82.5	61,083
Rural	12.7	528	8.2	1,897	14.3	61,083
Estate	7.4	528	3.5	1,897	3.2	61,083
How many students are enrolled in undergraduate programs?						
Fewer than 1,000	4.5	528	—	—	—	—
1,000–2,499	12.5	528	—	—	—	—
2,500–4,999	25.0	528	—	—	—	—
5,000–9,999	22.9	528	—	—	—	—
10,000–19,999	22.5	528	—	—	—	—
20,000 or more	12.5	528	—	—	—	—
Current position						
Rector	0.6	528	—	—	—	—
Vice-chancellor	1.3	528	—	—	—	—
Dean	13.6	528	—	—	—	—
Department/Faculty chair or head registrar	31.1	528	—	—	—	—
Professor	—	—	0.1	1,897	—	—
Associate professor	—	—	2.7	1,897	—	—
Assistant professor	—	—	0.1	1,897	—	—
Senior lecturer	—	—	0.9	1,897	—	—
Lecturer	—	—	89.4	1,897	—	—
Full-time student	—	—	—	—	99.0	61,083
Other	53.4	528	6.8	1,897	—	—

HEI = higher education institution, — = no data available.

Student background information. The student respondents were mostly female (67.7%) and nearly all were domestic students (98.9%). Most lived in estate areas (43.0%); 32.2% were staying near their HEIs. Family members (relatives) provided housing support to 61.8% of the student respondents, and the family or guardian provided financial support to 88.6% for tuition fees and living expenses. During a self-evaluation of their socioeconomic status, 49.3% of the respondents (the highest number) said that they belonged to the lower-middle class (levels 4 and 5). For 31.9% of the students, the main source of household income was self-employment (farming) (Table 25).

Internet and Technology Access

Remote education during the COVID-19 pandemic. According to more than 98.0% of the teacher, student, and administrator respondents, their HEIs provided remote learning during the COVID-19 pandemic. Regarding the delivery method, the HEIs used mostly online learning, 78.0% of the administrator respondents and 73.2% of the teacher respondents said. But for 20.8% of the administrators and 25.3% of the teachers, their HEIs offered both online and offline courses. Among the student respondents, 87.2% learned mostly online.

Table 25: Student Background Information—Viet Nam

Item	Students	
	Yes (%)	Responses (no.)
Gender		
Male	32.3	61,083
Female	67.7	61,083
Nationality		
Domestic	98.9	61,083
Foreign	1.1	61,083
Current residence location		
Urban	42.0	60,980
Rural	15.1	60,980
Estate	43.0	60,980
Boarding near the HEI	32.2	61,083
Housing status		
Student dormitory (on campus)	9.0	61,083
With family members (relatives)	61.8	61,083
Independent	29.2	61,083
Main source of funding for tuition fees and cost of living		
Scholarship (waived tuition fee)	2.0	61,083
Self-financed (by the family or guardian)	88.6	61,083
Self-financed (by the student)	5.8	61,083
Student loan	2.9	61,083
Other	0.7	61,083
Self-evaluated socioeconomic status		
Low (levels 1–3)	13.7	60,922
Lower-middle (levels 4 and 5)	49.3	60,922
Upper-middle (levels 6 and 7)	28.3	60,922
High (levels 8–10)	8.7	60,922
Main source of household income		
Salaries and wages (government employment)	21.6	61,083
Salaries and wages (private sector employment)	16.0	61,083
Salaries and wages (foreign employment)	3.1	61,083
Self-employment income (running own business)	9.2	61,083
Self-employment income (farming)	31.9	61,083
Self-employment income (casual work)	13.7	61,083
Charity (donations from relatives)	0.2	61,083
Pensions	1.7	61,083
Net property income (interest and other investment income received)	0.7	61,083
Other	1.9	61,083
Father's highest level of education		
At least some primary education	14.0(16.0)	61,083
At least some secondary education	40.9(47.0)	61,083
Completed technical and vocational education	7.8(9.0)	61,083
At least some university/college education	24.4(28.0)	61,083
Don't know / Not applicable	13.0	61,083
Mother's highest level of education		
At least some primary education	15.8(17.6)	61,083
At least some secondary education	46.2(51.4)	61,083
Completed technical and vocational education	6.1(6.8)	61,083
At least some university/college education	21.8(24.2)	61,083
Don't know / Not applicable	10.1	61,083

HEI = higher education institution.

Higher education institution support for, and promotion of, remote education. According to the administrator respondents, the three support services most often provided by HEIs to teachers were (i) IT support teams (74.1%), (ii) professional development in remote teaching strategies (71.8%), and (iii) support in instructional design and online course creation (70.5%). Among 4.0% of the administrator respondents, however, their HEIs provided no support to teachers for remote teaching.

An on-campus multimedia production studio exists in 44.7% of HEIs to support remote teaching, the administrators said. About 77.1% of the administrators also reported that their HEIs had network operations centers. Each center, in most cases (40.7%), had an IT support team with a staff of five or fewer; 33.3% of the centers had 6–10 IT team members, and 19.1% had more than 10 team members. However, 6.8% of the administrators said that their HEIs did not have an IT support team on campus.

The three most effective support services provided by HEIs to teachers during the pandemic, according to the administrator respondents, were (i) IT tech support and troubleshooting services (75.0%), (ii) workshops in online training and skills (50.0%), and (iii) high-quality digital content and operation environment (38.2%).

The three most effective HEI support services for students, according to the administrators, were (i) IT tech support and troubleshooting services (55.7%), (ii) remote learning guidance (33.7%), and (iii) workshops in online training and skills (33.0%).

Teachers rated the following as the three most effective actions taken by their HEIs to advance remote teaching during COVID-19: (i) acquiring videoconferencing licenses (89.5%), (ii) providing teachers with guides to online teaching and learning (83.9%), and (iii) mandating online teaching (82.3%). Supporting teachers' laptop or desktop needs at home was rated *lowest* (4.3%).

The three technological tools most used by the teachers during the pandemic were (i) videoconferencing (96.0%); (ii) communicating with students by mobile phone via SMS, WhatsApp, Viber, or Messenger (75.8%); and (iii) communicating with students through email (74.2%).

Regarding their required training, the majority of the teacher respondents said that their HEI required them to go through 3–4 hours of training (in 20.8% of cases) or less than 3 hours of training (30%) to teach online. However, 23.5% of the teachers said that no training was required. The type of faculty training in online teaching was diverse and varied somewhat from the options listed in the survey questionnaire. HEIs trained teachers mostly in (i) online teaching pedagogies (84.3%), (ii) curriculum and/or instructional design and online course creation (55.9%), and (iii) online assessment creation (48.1%). In 6.4% of the HEIs, however, teachers were not trained to teach online.

Internet access environment. According to 93.4% of the administrator respondents, 86.9% of the teachers, and 79.5% of the students, their HEIs provided free internet on campus. The Wi-Fi (or LAN) connections were rated at least *fair* in quality, reliability, and speed by 87.1% of the teacher respondents.

The teachers were highly equipped with laptops (96.6%) and smartphones (72.4%); internet access via tablets was much less common in this group (17.1%). Most students surveyed had smartphones (82.2%) and laptops (75.7%), but only 5.5% had tablets. Students generally had a lower digital device ownership rate than teachers, but their device retention rate was higher.

Most teachers had landline (54.0%) and mobile broadband (mobile data package) (45.9%) connectivity at home. Students mostly relied on landline connectivity (62.7%). Mobile data plans were declared very affordable or moderately affordable by 46.9% of the student respondents, and not affordable by 6.5%. Mobile network quality was rated *good and stable*, or *better*, by more than 84.1% of the teachers and 71.5% of the students.

Student Engagement in Online Learning

Adaptation to remote education and teacher–student interaction. The learning environment preferred by the highest number of teacher respondents (37.1%) was mostly face-to-face learning; 26.0% favored completely face-to-face learning. Only 2.8% of the teachers would rather go mostly online. Among the students, 32.9% preferred mostly face-to-face learning; only 5.9% would rather learn mostly online.

Teachers using online communication tools could communicate effectively with students, according to 69.5% of the teacher respondents. They rated online communication tools *extremely effective* (24.4%) or *moderately effective* (45.1%). Students, on the other hand, gave the same ratings in only 51.2% of cases.

Online student assessment and evaluation was acceptable, 82.9% of the student respondents said.

To communicate with students during the COVID-19 pandemic, 84.5% of the teacher respondents primarily used email. They also used LMS bulletin boards or messaging (50.3%) and Facebook Messenger (50.6%).

Teachers need various technology tools to teach online. The largest number of teacher respondents claimed intermediate-level proficiency in the use of these teaching tools: web conferencing (45.9%), digital collaboration tools (50.4%), video lectures (47.4%), online course development (49.6%), and online assessment (50.0%).

Digital literacy for remote learning during the pandemic was placed at the novice level by 15.1% of the student respondents, at the intermediate level by 72.2%, and at the advanced level by 12.7%. Teacher knowledge or expertise in using online learning tools during the pandemic received *good* ratings from 47.9% of the students, and *very good* from 16.6%. Only 2.5% of the students said that their teachers had *poor* or *very poor* online learning knowledge or expertise.

Students rated their level of adaptation to the different remote learning experiences as *moderately* or *very well* adapted in most cases: class preparation (80.7%), instructor lectures (76.7%), use of class materials (78.4%), laboratory simulations (39.2%), team projects (76.8%), assignments (79.3%), assessments (75.5%), and feedback (74.5%).

The level of student attainment through remote learning was rated *moderately high* or *very high* by teachers in the following categories: learning motivation (61.2%), major knowledge and skills (73.9%), collaborative learning experience (49.3%), learning engagement (75.9%), learning gap (48.8%), and learning burden (44.6%). Students gave the same ratings to learning motivation (55.0%), major knowledge and skills (53.3%), collaborative learning experience (62.2%), learning engagement (83.7%), student interaction with classmates (52.0%), and student–teacher interaction (52.1%).

The overall remote learning experience during the COVID-19 pandemic was rated *satisfactory* or *very satisfactory* by 80.7% of the student respondents.

Online Learning Engagement of Low-Income Students

The effectiveness of online communication tools, level of digital literacy, satisfaction with the remote learning experience, obstacles or problems in remote learning, and online versus on-campus learning experiences during the pandemic were rated by students grouped according to their perceived socioeconomic status (“1” for those from poor families with very little or no education and working in low-paying jobs to “10” for students from wealthy, highly educated families holding high-paying jobs).

The use of online communication tools was rated *extremely effective* by 11.5% of low-income, 13.0% of lower-middle-income, 14.6% of upper-middle-income, and 20.0% of high-income students. But 7.6% of low-income, 4.3% of lower-middle-income, 3.4% of upper-middle-income, and 5.2% of high-income students said it was *not at all effective*.

Digital literacy was placed at the advanced level by 9.2% of low-income, 10.4% of lower-middle-income, 15.6% of upper-middle-income, and 21.6% of high-income students. However, 26.1% of low-income, 15.7% of lower-middle-income, 10.0% of upper-middle-income, and 11.0% of high-income students said it was only at the novice level.

The overall remote learning experience was pronounced very satisfactory by 9.5% of low-income, 8.8% of lower-middle-income, 9.1% of upper-middle-income, and 15.2% of high-income students. Among 3.7% of low-income, 1.7% of lower middle-income, 1.3% of upper-middle-income, and 1.9% of high-income students, however, dissatisfaction with the remote learning experience was high.

Inability to access technology devices was mentioned as an obstacle or problem in online learning by 19.3% of low-income, 11.7% of lower-middle-income 9.5% of upper-middle-income, and 14.9% of high-income students; inability to connect to the internet by 14.6% of low-income, 9.6% of lower-middle-income, 8.0% of upper-middle-income, and 10.9% of high-income students; and a poor internet connection by 82.1% of low-income, 84.8% of lower-middle-income, 83.6% of upper-middle-income, and 82.5% of high-income students.

Fatigue, boredom, and stress from continuous screen viewing were noted as an online learning obstacle or problem by 65.1% of low-income, 67.6% of lower-middle-income, 69.4% of upper-middle-income, and 62.4% of high-income students; maintaining student–teacher interaction, by 41.1% of low-income, 46.6% of lower-middle-income, 50.7% of upper-middle-income, and 48.4% of high-income students; and difficulties experienced in online assessments and exams, by 32.0% of low-income, 31.1% of lower-middle-income, 29.7% of upper-middle-income, and 29.1% of high-income students.

Asked to compare online and on-campus lectures, 61.4% of lower-middle-income, 62.0% of lower-middle-income, 62.1% of upper-middle-income, and 61.9% of high-income students said that on-campus lectures were better; 14.1% of lower-middle-income, 12.5% of lower-middle-income, 13.8% of upper-middle-income, and 14.8% of high-income students said that online lectures were better; and 16.6% of low-income, 17.0% of lower-middle-income, 16.8% of upper-middle-income, and 17.4% of high-income students expressed no preference between the two.

Regarding the level of student attainment through remote learning, learning motivation scored *very low* or *moderately low* among 56.1% of low-income students, and *moderately high* or *very high* among 43.9%. It was rated *very low* or *moderately low* by 34.8% of high-income students, and *moderately high* or *very high* by 65.2%.

Among low-income students, major knowledge and skills obtained *very low* or *moderately low* ratings from 58.5%, and *moderately high* or *very high* scores from 41.5%. High-income students, on the other hand, gave it *very low* or *moderately low* ratings in 36.1% of cases, and *moderately high* or *very high* in 63.8%.

Collaborative learning experience was rated *very low* or *moderately low* by 49.4% of low-income students, and *moderately high* or *very high* by 50.6%. It scored *very low* or *moderately low* among 28.5% of high-income students, and *moderately high* or *very high* among 71.5%.

Learning engagement received ratings of *very low* or *moderately low* from 25.8%, and *moderately high* or *very high* from 74.2%, in the low-income group of students. It was rated *very low* or *moderately low* by 13.4% of high-income students, and *moderately high* or *very high* by 86.6%.

Challenges and Issues

Major sources of funding for online learning, according to administrator respondents, were the HEI itself (17.6%), the government (77.7%), and the private sector or nonprofit organizations (4.2%).

The top three challenges of online teaching mentioned by the teacher respondents were (i) limited student access to devices (71.4%), (ii) limited knowledge and training in online teaching (35.8%), and (iii) poor or no internet access for teachers and students (27.5%).

The top three disadvantages of online teaching and learning cited by the teachers were (i) the need for technology devices and reliable internet access (82.5%); (ii) challenging student engagement (81.3%); and (iii) unmotivated, often distracted students (77.8%).

The top three challenges or obstacles in the deployment of remote learning (online and/or offline), according to the administrator respondents, were (i) limited or no access to the internet and devices among students (87.5%), (ii) university bandwidth issues and poor internet connectivity (64.8%), and (iii) lack of teacher know-how in remote teaching and learning (64%).

The top three challenges or obstacles mentioned by the teacher respondents were (i) poor internet connection (73.3%), (ii) poor engagement with students (63.4%), and (iii) difficulties experienced in assessing student performance (56.2%).

For the student respondents, the top three challenges or obstacles were (i) poor internet connection (83.9%); (ii) fatigue, boredom, and stress from continuous screen viewing (67.3%); and (iii) poor quality of video collaboration software (48.7%).

IV. Challenges and Recommendations

Remote Learning Delivery Method and Student Access during the Pandemic

Delivery Method for Remote Learning

Most students in the DMCs surveyed—79.1% of the student respondents from the Philippines, 78.2% from Pakistan, 77.3% from Nepal, and 76.1% from Indonesia—learned online during this period. In Viet Nam—where the government provided funding to most (public) HEIs to enable them to cope with the crisis—the schooling of 87.0% of the students was mostly online.

Access to Remote Instruction and Resources

In the six DMCs surveyed, more than 10% of the students owned smartphones rather than laptops. In Pakistan, 40.5% of the student respondents owned smartphones and 20.3% had cell phones; but 4.0% did not have any digital device for online learning. The preference for face-to-face learning that was expressed by a majority of the students (57.5%) is therefore understandable. According to the analysis done for this study, the higher the ratio of personal ownership of smartphones and laptops, the greater the preference shown for the 50:50 face-to-face and online learning option. The lower the smartphone ownership ratio, the more pronounced the preference for face-to-face classes over online or hybrid learning.

Critical areas of deficiency in HEI policy support in this regard were student internet access at home, affordability of mobile data plans, and mobile network quality. Lacking such support, most students were kept from acquiring the capabilities they needed for progressive learning online. HEIs should consider the students' circumstances and support needs when setting policy priorities for effective and continuous online learning. The study found a compelling need for easier access to smartphones, laptops, and other internet-ready devices. A stable IT network environment must also be built. Where the ratio of internet access at home was high—such as 76.2% in Indonesia and 69.7% in Pakistan—preferential support for laptops would also have been a strategic approach for successful learning continuity during the COVID-19 pandemic.

To promote online learning, government support is needed as well to make the mobile network more accessible, digital devices more affordable, and mobile data plans more readily obtainable.

Engagement in Online Learning during the COVID-19 Pandemic

Communication

With online learning taking the place of traditional on-site classes during the pandemic, face-to-face and real-time class communication had to be restructured to conform to the new environment and with accessible tools. Distance communication tools, despite fairly common use, were often perceived as a challenge in teacher–student discourse. Tools usually mentioned, such as Messenger (for real-time communication) and email (for non-real-time communication), may have been used regularly by students and teachers even before the pandemic. However, online communication seems to have widened the communication gap between these respondent groups. A high level of horizontal communication in class management and teaching and learning is generally taken to be an important condition for effective learning and higher academic performance. As classes moved online without sufficient preparation, and until teachers and students could all reach the stage of effective communication in the new environment, the shift would inevitably be costly. Practice and adaptation patterns nonetheless varied between cultures and defy easy generalization.

Satisfaction with communication tools and with teacher–student interaction in the online education environment significantly affects the success of online education. Students and teachers in the six DMCs responded differently to questions about communication effectiveness. More than 75.0% of the teacher respondents said that communication with the students was more satisfying (*moderately effective* or *extremely effective*) than it was before COVID-19, but only 30.0%–67.0% of the students agreed and their level of satisfaction varied between countries. In countries with relatively higher student satisfaction, teachers tended to communicate in real time through online programs and messenger software (e.g., WhatsApp or Facebook Messenger) rather than taking non-real-time approaches. Indonesian student satisfaction with teacher–student communication (67.0%), for instance, was noted by their teachers who use WhatsApp with more than 97.8% of their students. In Nepal, on the other hand, where student satisfaction with communication with their teachers was only about 37.0% (*moderately effective* or *extremely effective*), email was the primary tool for teacher–student communication (in 61.7% of cases), and the utilization rate of messenger software (33.6%), a real-time communication tool, was low. In other words, communicating through email or bulletin boards, which are non-real-time communication tools, seemed to be less satisfying for students. Real-time communication strategies are more effective and teachers should use them in distance learning. However, while some software tools are accessible for free, those platforms that provide messenger or videoconferencing tools (VCTs) for on-air group (class) discussions are unaffordable for many. Systematic and innovative communication tools that could encourage real-time communication should therefore be supported at the national or institutional level.

Student Achievement

The percentage of respondents who gave high (*very high* or *moderately high*) ratings to the perceived level of acquisition of major knowledge and skills through remote learning during the pandemic differed slightly between the six DMCs. Overall, about half of all student respondents on average (40.0%–59.0%) said that they perceived a high level of knowledge and skills acquisition. The rest seemed to have achieved less than they expected. A significant learning gap exists among students, who have had to deal with many obstacles in their studies inevitably affecting their perception of improvements in their knowledge and skills. The perceived learning gap reached as high as 58.8% (*very high* or *moderately high*) and the learning burden as high as 68.0% in Viet Nam; 43.4% (*very high*) and 68.0% (*moderately high*) in Indonesia; 47.8% (*very high*) and 57.6% (*moderately high*) in the Philippines; 41.9% (*very high*) and 63.3% (*moderately high*) in Nepal; and 41.2% (*very high*) and 55.9% (*moderately high*) in Pakistan.

Student achievements tend to be influenced by complex and interrelated factors. Apart from students' personal qualities, teaching delivery and teachers' rapport with students in particular are likely to be instrumental in shaping student perceptions of effective teaching (Sofyan, Barnes, and Finefter-Rosenbluh 2021). However, emergency online learning during COVID-19 limited student access to these influencing factors.

Communication Training

Active teacher–student communication—an important factor in student satisfaction with their learning experience on campus—has been highlighted as a positive predictor of student engagement both before and during the COVID-19 pandemic. Increasing teacher–student communication in the face of restrictions and obstacles is a major strategy for amplified student engagement and academic growth, and for student success in higher education. During the COVID-19 pandemic, HEIs provided various types of training for teachers. In the survey, teachers said training for online teaching in the following areas was required by their HEIs for an adequate response to COVID-19: blended learning techniques and models, curriculum and instructional design and online course creation, guidelines for online training, and multimedia content training. To keep HEI education going with infrastructure construction and device support during the pandemic, training was needed to increase student engagement by prioritizing interaction and communication between teachers and students. HEIs in each DMC focused on building infrastructure and supporting devices for online education.

Online Learning Experience during the COVID-19 Pandemic according to Socioeconomic Status

Lower-income students were more likely to experience difficulty in online learning when COVID-19 forced schools to close. Socioeconomic status affected the mitigation of adverse effects on students in online learning during the pandemic, which required the use of digital devices and broadband internet. Many were compelled by social inequality to seek school or government support for access to digital devices and the internet (Adedoyin and Soykan 2020). Many countries provided free internet data subscriptions to enable access to online learning platforms and emergency remote learning among low-SES students.

To understand better student online learning success according to their socioeconomic status, the study team analyzed online learning experiences during the COVID-19 pandemic among students in different socioeconomic groups (including students coming from poor families with very little or no education and working in low-paying jobs, to students from wealthy, highly educated families, holding high-paying jobs). The study analyzed digital literacy for remote learning, effectiveness of online communication tools, overall satisfaction with remote learning, obstacles or problems encountered, and preference for on-campus or online lectures based on student social standing.

Digital literacy for remote learning. HEIs responded to the COVID-19 pandemic with the emergent digital transformation of their educational activities and resources. But many students and teachers did not have enough digital skills to solve problems, manage information and resources, and collaborate effectively with their peers in online learning environments. For online learning to be integrated into the curriculum, their digital skills must improve.

Students perceived the level of digital literacy according to socioeconomic status (low and high only) in six DMCs. More student respondents in the low-SES group placed their level of digital literacy at the novice level, rather than the advanced level. However, among students with intermediate-level digital literacy, there was not much difference between the low-SES and high-SES groups. Digital literacy support should therefore be structured to preferentially improve the digital literacy of lower-income students.

Effectiveness of Online Communication and Overall Satisfaction with Remote Learning

Online communication for remote learning during the pandemic was declared at least moderately effective by a significant proportion of the survey respondents, especially among the higher-income groups. But overall, 25.0%–45.0% of students in lower-income groups in the six DMCs said that the experience was unsatisfying. Low-SES students generally had difficulty migrating from traditional courses to emergency online courses since they were unable to attend school during the pandemic. Several factors may have affected the results. Related challenges included interaction with faculty and peers, learning content and resources, increment in tuition debt, and psychological and medical assistance (Adedoyin and Soykan 2020). Several studies reported that increased poverty excessively reduces internet accessibility and internet connectivity for online learning (Adedoyin and Soykan 2020). Therefore, although HEIs in the DMCs gave priority to providing free internet data plans for students in the low-SES group, the support should have focused instead on enhancing the online learning experience.

Pedagogical strategies must be applied, and experiences designed, to foster successful learning experiences and engagement, together with support for student internet access and use of learning resources. In particular, low-SES students need support for their participation in online or offline courses to reduce learning loss in comparison with their high-SES peers. However, students affected by the COVID-19 pandemic came from all SES levels in the DMCs studied (except Viet Nam, where public HEIs predominate). Support should, therefore, be centered on a more pedagogical approach to enhance the student experience.

The analysis does not indicate a large gap between student respondents in the DMCs according to SES level or gender in terms of satisfaction with emergency online education. In fact, in some countries, low-SES and high-SES students showed similarities in learning motivation and participation. Although students in higher education in the six DMCs were more likely to be satisfied with their remote learning experiences irrespective of socioeconomic status, the dissatisfaction ratio tended to be higher among low-SES students in each country. Therefore, more attention should have been given to strengthening the educational experience in HEIs while supporting low-SES students during COVID-19.

Administrative and Government Support

With the implementation of online learning at HEIs in response to the COVID-19 pandemic, HEIs in the DMCs showed responses and approaches characteristic of their funding source category.

Online learning during the COVID-19 pandemic—including emergency remote teaching and learning—should have ensured a satisfying learning experience for students through regular support for internet infrastructure, learning management platforms, teaching and learning content, teaching and learning tools, and a minimum level of quality standards, together with safeguards for academic integrity.

HEIs that prioritized online learning in response to COVID-19 provided support not only for student learning but also for improvements in teaching quality. HEIs also monitored student learning progress and implemented online support systems, teaching and learning guidance, teacher–student communication support, and dropout prevention programs.

HEI efforts to aid emergency online learning during the pandemic needed to start with establishing proper and adequate infrastructure. Then the HEIs could devise and implement—with their resources—response strategies that accorded with student and teacher minimum—or basic—requirements for online learning.

Important HEI considerations in online education during the COVID-19 pandemic were education management systems, internet access and broadband connections, and content development. Unlike government-assisted elementary and secondary schools, online education relies mainly on infrastructure investments made in most cases by the HEIs themselves out of their budgets. In the DMCs, the type of HEI (public or private) was an important distinguishing factor for budgetary resources for emergency online education during the COVID-19 pandemic. Countries and school types with government support have a fair online learning environment. In Viet Nam, 87.0% of student respondents in the survey participated in online learning provided by their HEIs during the pandemic. HEI education can thus be delivered as emergency learning content through online learning.

In DMCs where HEIs are mainly private, support for their online education programs during the pandemic was limited compared with support for elementary and secondary education. The assistance they received included public learning management systems funded by the government or international organizations, open education content (e.g., OERs, MOOCs), and the inter institutional sharing of online courses.

If private HEIs in the DMCs cannot invest in constructing their systems for online education—especially without government funding or outside support—it was suggested that a shareable e-learning platform be built to sustain education until the pandemic ended. If public HEIs in the DMCs have government support for online learning, they should encourage teachers to ensure the quality of education by developing high-quality online content and interaction. For example, HEIs can provide incentives to teachers to develop content or run courses, and equip them with course development workshops, online teaching strategies, and manuals. These approaches represent what HEIs should establish to guarantee essential conditions for online classes to continue.

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Online Learning during the COVID-19 Pandemic

A Review of Student Experiences in Asian Higher Education

This publication analyzes the online learning experiences of higher education students in six Asian countries during the pandemic to illustrate how to provide technical and learning support, narrow the digital divide, and direct future policy. Drawing on surveys from Indonesia, Nepal, Pakistan, the Philippines, the Republic of Korea, and Viet Nam, the report touches on areas including internet availability, student satisfaction, and levels of student–teacher interaction. Providing country breakdowns, it considers funding for online education, underscores the challenges for low-income students, and sets out how to fill the skills and training gap to offer equal access to better education.

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