EDITED BY

Peter Karl Kresl

CITY INNOVATION IN A TIME OF CRISIS

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10. Regional characteristics in crisis management among 127 universities during the COVID-19 period: an analysis of 207 cases from the WURI rankings (2021–2023)

Hyunjee Hannah Kim, Min-kyung Sung, Manfred Kirchgeorg and Dong-sung Cho

INTRODUCTION

The domain of higher education has traditionally been esteemed as a stronghold of learning and intellectual development, as well as a pivotal participant in the management of societal crises (Liu et al., 2022; Reimers and Marmolejo, 2022; Gigliotti, 2020). Universities have consistently taken on a twofold mandate: nurturing the intellectual growth and practical abilities of their students and simultaneously contributing to the well-being of the communities they serve (Al-Youbi et al., 2021; Gan et al., 2022; Tripon et al., 2023). These institutions have acted as pillars of resilience and repositories of aid during times of crisis, utilizing their extensive resources, research prowess and specialized expertise to furnish both immediate relief and sustained assistance. This foundational role within the community's network of support has frequently reached beyond the immediate locale, aiming to tackle larger issues that impact society at a national and even international level (Liddle and Addidle, 2022; Domínguez-Gómez, et al., 2021).

The onset of COVID-19 highlighted the critical roles that universities play at the intersection of education, community engagement and the international health response. Faced with a crisis of unprecedented scale, higher education institutions were forced to venture into unknown territory. As the virus crossed boundaries and put pressure on various systems, universities worldwide found themselves in a position where swift innovation and flexibility were crucial. In response, they reimagined their teaching methods, redirected research efforts

and intensified their outreach to address the immediate needs imposed by the pandemic (Mukyala and Namono, 2023).

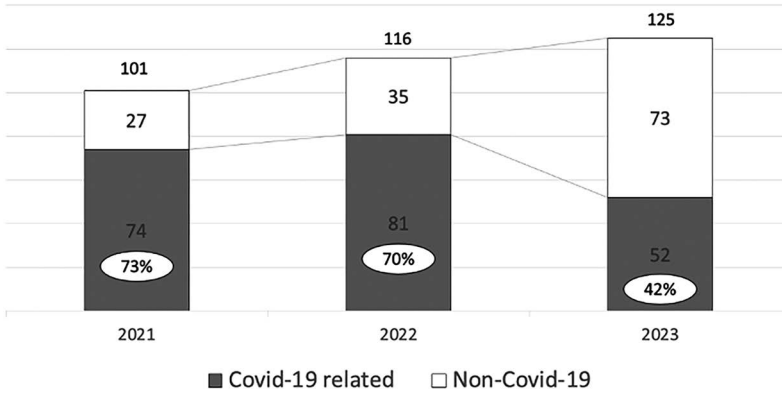
In this context, we analyzed 207 cases from 127 universities during the COVID-19 period by using data from the World University Rankings for Innovation (WURI) for the 2021–2023 period. The WURI ranking assesses higher education institutions' real impact on industry and society, highlighting innovative education, research and engagement with society. It collects cases of each institution's innovative activities across various categories, where crisis management is one of the categories. We analyzed these cases, which were collected for the crisis management category during 2021–2023, and assessed how higher education institutions reacted to the COVID-19 crisis in various ways. We believe the new paradigm of ranking provides a comprehensive case study analysis of universities' responses to the COVID-19 crisis, offering insights into their contributions to local and global communities during this period (IPSNC, 2020).

This chapter aims to delve into the traditional crisis management role of higher education, exploring its evolution in the face of a global pandemic. By analyzing case studies drawn from the WURI ranking data, the chapter will paint a vivid picture of the dynamic and multifaceted role that universities have played in the wake of COVID-19 and how this might reshape the landscape of higher education and its crisis management functions in the years to come.

CRISIS MANAGEMENT CASES OVERVIEW

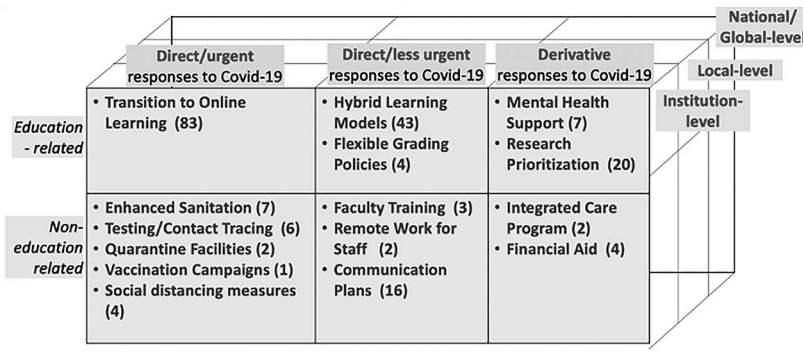
In the midst of the COVID-19 pandemic, higher education institutions faced unprecedented challenges that necessitated a reevaluation of their crisis management strategies. Spanning from 2021 to 2023, WURI ranking collected 342 innovative cases from 269 institutions in the crisis management category. Among these, 207 cases from 127 institutions were COVID-related cases. Seventy-four cases were from 2021, 81 cases were from 2022, and 52 cases were from 2023 (See Figure 10.1).

The core findings revealed that universities adapted to the crisis in innovative and diverse ways. Fifteen distinct types were recognized as stated in Figure 10.2. These responses were categorized based on their urgency and educational relation. Direct and urgent educational responses included a transition to online learning, while non-urgent, education-related actions saw the adoption of hybrid learning models and flexible grading policies. Non-educational, direct responses involved enhanced sanitation and testing, and derivative responses addressed broader issues like mental health support and financial aid. These varied approaches reflect the multifaceted roles universities took on, addressing the immediate needs of transitioning educational



Source: WURI Ranking Crisis Management Cases, 2021–2023.

Figure 10.1 *Trend in COVID-19-related innovative cases in WURI crisis management category, 2021–2023*



Source: WURI Ranking Crisis Management Cases, 2021–2023.

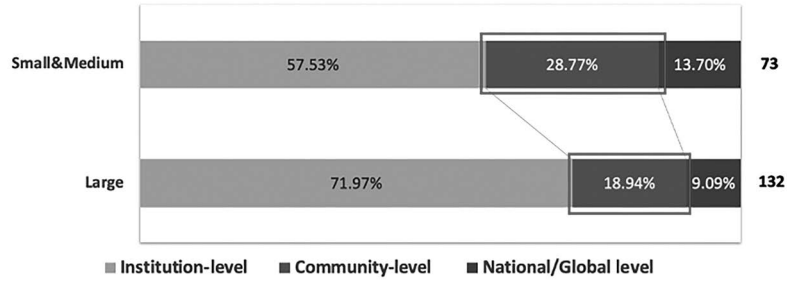
Figure 10.2 *Distinct types of COVID-19 responses from higher education institutions*

platforms and maintaining health protocols, as well as supporting their communities in coping with the pandemic's extensive impacts.

Initially, we posited that higher education institutions would progressively move from swift, immediate responses to COVID-19 to more sustained, long-term strategies, with a pivot from direct education measures to broader, resilience-building, non-education-related actions. This evolution was anticipated to reflect a strategic shift towards greater adaptability in confronting persistent challenges. However, this hypothesis proved to be partially correct and largely applicable to large-sized and urban-based institutions. When categorizing these entities by size and location, it became evident that different types of institutions engaged in a diverse array of actions, resulting in a multifaceted tapestry of crisis management responses to the complexities presented by the pandemic.

The examination of how top-ranked universities responded to COVID-19 indicates a pronounced emphasis on local community support. Institutions within the top 50 rankings notably prioritized initiatives aimed at addressing the needs of their immediate surroundings. Within the top 50 institutions, 25.69 percent showed community-level pandemic responses compared to only 18.75 percent of institutions beyond the top 50. Highly ranked institutions ventured beyond their academic confines to actively participate in and enrich the local response to the pandemic. Whether through health campaigns tailored to the public, assistance to local enterprises, or resources for educational establishments, these leading higher education institutions showcased their dedication to harnessing their capacities for the greater good of their communities amidst the global health crisis.

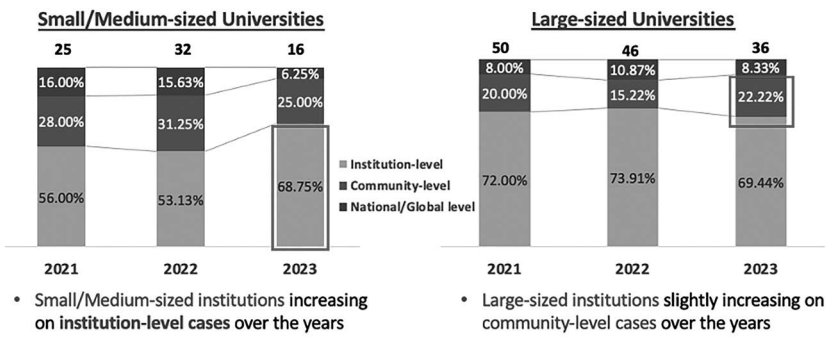
A notable trend was the differentiation in response based on university size. In the response to COVID-19, it was primarily the small and medium-sized universities that led the way in initiating community-level support and projects. Among all the small and medium-sized institutions that engaged in innovative programs related to COVID-19, 28.77 percent were focusing on responses for their local community, whereas only 18.94 percent of large-sized institutions were investing in their local community. Additionally, 72 percent of large-sized institutions were primarily investing in their institution-level efforts (see Figure 10.3). When further scrutinizing these cases in depth, we found that large-sized institutions could not help focusing on their institution-level programs to overcome COVID-19. However, small and medium-sized institutions, often more embedded in their local environments, leveraged their agility and strong community ties to deliver targeted aid and services. Their efforts underscored the critical role that smaller educational entities play in directly addressing and supporting the immediate needs of their surrounding communities during crises.



Source: WURI Ranking Crisis Management Cases, 2021–2023.

Figure 10.3 Distribution of innovative cases by level and size, 2021–2023

In particular, when we analyze the trend by university size, a notable evolution is observed over the years. Initially, small and medium-sized universities concentrated on community-level initiatives at the onset of COVID-19 in 2020; however, they have progressively focused on institution-level cases, with a substantial increase from 56 percent in 2021 to 68.75 percent in 2023 (see Figure 10.4). In contrast, large-sized universities primarily addressed institutional-level initiatives, starting at 72 percent in 2021 and decreasing slightly to 69 percent in 2023. Nonetheless, they exhibited a modest uptick in community-level involvement, rising from 20 percent in 2021 to 22.22 percent in 2023 (see



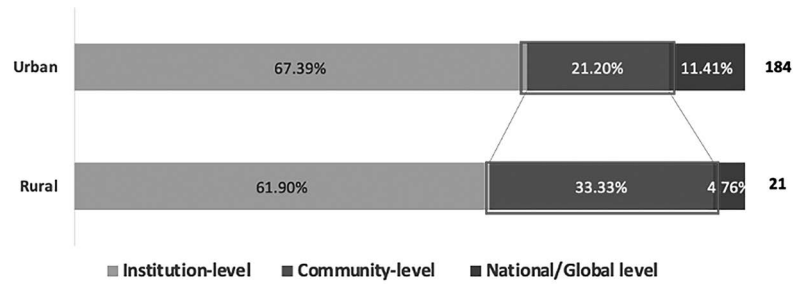
Source: WURI Ranking Crisis Management Cases, 2021–2023.

Figure 10.4 Trends of Covid-19-related innovative initiatives by size and level, 2021–2023

Figure 10.4). This shift suggests that while smaller institutions initially prioritized immediate local community support, they gradually moved towards enhancing their internal management, possibly by integrating advanced systems initially set up by larger institutions for crisis management. Conversely, larger institutions maintained a relatively steady focus, with a slight increase in attending to internal issues first, followed by a gradual extension of their community engagement. This trend reflects a strategic divergence, with the size of the institution shaping the scope and emphasis of their response to the global health challenges presented by the pandemic.

Analyzing the distribution of innovative initiatives by location, it is evident that higher education institutions located in rural areas display a greater emphasis on community-level initiatives in managing the COVID-19 crisis. In rural areas, 33.33 percent of such institutions spearheaded community-focused efforts, compared to only 21.20 percent in urban settings (see Figure 10.5). This disparity highlights the closer ties that rural universities maintain with their local communities, showcasing their commitment to serving not just as educational entities but as active community supporters during challenging times.

These analyses highlight the pivotal role higher education institutions have played, not only in academic pursuits but also in addressing broader societal challenges during global crises. Their responses to the pandemic exemplify their innovative spirit and their dedication to both local and international communities. Next, we will delve into specific examples that illustrate the diverse approaches and strategies employed by individual institutions in their crisis management efforts. All the following information was collected from WURI Ranking Cases.



Source: WURI Ranking Crisis Management Cases, 2021–2023.

Figure 10.5 Distribution of innovative initiatives by level and location

CASE ANALYSIS

Case 1: Academic Response to the Crisis by University of Mostar (Transition to Online Learning)

1.1 Overview of university

The University of Mostar is a public university in the city of Mostar in Bosnia and Herzegovina. The city of Mostar has been a UNESCO World Heritage site since 2005 and is the cultural capital of Herzegovina. The university, in a UNESCO heritage city, enhances public education, respects global cultures, and impacts the community.

The University of Mostar has around 13,000 students with around 2,000 teaching and non-teaching staff. There are 11 faculties, an academy of fine arts, eight institutes and the student center within the university. There are 50 majors available, 46 specializations and 70 study groups. The school also offers master's and doctoral degrees in some courses for more advanced study.

1.2 Background

The initiative titled 'Academic Response to the Crisis: The University of Mostar Responds to Challenges and Pushes Boundaries' was born out of the unprecedented challenges posed by the COVID-19 pandemic. As the pandemic swept across the globe, educational institutions were faced with the daunting task of ensuring the safety of their communities while maintaining the continuity of education. Recognizing the gravity of the situation, the university swiftly established the University Crisis Headquarters, comprising key personnel from the university.

1.3 Program overview

The University of Mostar's strategic response to the COVID-19 pandemic was a well-coordinated effort led by Prof. Zoran Tomić, and Prof. Ivan Vasilj. The team, which included key university personnel, worked with various stakeholders such as the university community, industry partners and government entities. The strategy involved setting up a crisis staff, prioritizing safety and transitioning to remote learning, ensuring the continuity of education during the pandemic.

The university's IT center launched SUMIT, the largest e-learning platform project, as part of this strategy. From its inception, SUMIT has been conducting online workshops for faculty and staff to ensure the smooth operation of the platform. The university also encouraged student participation by holding a contest to name the e-learning platform.

SUMIT has not only supported university curricula but has also played a pivotal role in shaping educational content for primary and secondary schools in Bosnia and Herzegovina. University Television (SUM TV) has produced comprehensive classes for the first through fifth years.

For the first time, over 100 schools following the Croatian curriculum were integrated into a single system through this program. This significant contribution by the university has had a profound impact on the country's education system.

1.4 Program impact

The University of Mostar's response to the COVID-19 pandemic had a significant impact at the institutional, local, national and global levels:

Institutional level: The university's swift transition to remote learning ensured the continuity of education for its students. This not only minimized disruptions to their academic progress but also provided a sense of normalcy during a challenging time.

Local level: The university's efforts extended beyond its own community. By providing support to over 100 primary and secondary schools in Bosnia and Herzegovina, the university ensured that younger students also had access to education during the pandemic. This not only benefited the students, but also provided relief to parents and teachers.

National and global level: The university's initiatives served as a model for other educational institutions across the country. The successful implementation of remote learning demonstrated the feasibility of such an approach during a crisis, potentially influencing national policies and practices in education.

Overall, the University of Mostar's response to the pandemic showcased the power of adaptability, collaboration and resilience in overcoming challenges and serving the community. It highlighted the crucial role of education in society and the importance of ensuring its continuity, even in the face of a global crisis.

The University of Mostar made its debut in the WURI rankings in 2023, securing a position in the top 200. Given the significant impact of its initiatives, it is anticipated that the university's ranking will continue to rise in the future.

Case 2: Academic Volunteering Initiative by the Polytechnic Institute of Bragança (Mental Health Support / Hybrid Learning Models)[1]

2.1 Overview of university

The Polytechnic Institute of Braganza (IPB) stands as a public institution of higher education with a primary mission to create, disseminate and advance scientific and professional knowledge. This is achieved through the seamless

integration of study, teaching and research-oriented activities. Situated in Bragança, a city in northeastern Portugal, the university serves as a hub for academic pursuits in various domains.

As a University of Applied Sciences, IPB covers a diverse spectrum of programs. The undergraduate courses offered include a wide range of programs, and the university provides an array of master's programs.

IPB also garners recognition for its significant contributions in applied research and its commitment to regional engagement. The institute boasts an enrollment of approximately 8,000 students and a faculty comprising 500 teachers and researchers. Research initiatives are conducted across eight primary areas, focusing on domains like health, demographic changes and well-being, secure and sustainable energy, as well as smart, eco-friendly and integrated transportation systems.

2.2 Background

The Academic Volunteering Initiative at tIPB was launched in response to the COVID-19 pandemic. It aimed to harness the collective strength of its academic community to address immediate social needs and provide a unique learning experience. The initiative has evolved to adapt to the changing needs of the community and society.

In 2020, the COVID-19 pandemic forced people into confinement, leading to numerous cases of unemployment, loss of family members and reduced income. This situation increased social disparities and inequalities, particularly affecting IPB's international students living abroad without family support. IPB responded by developing a comprehensive program targeting teachers, staff, students and the surrounding community.

2.3 Program overview

In the heart of the Polytechnic Institute of Bragança, a remarkable initiative was born. Under the leadership of Orlando Rodrigues, the President of IPB, and Calado Rodrigues, the Chaplain of IPB, the Academic Volunteering Initiative took shape.

During the COVID-19 pandemic, IPB initiated multiple programs targeting various facets of the community, involving faculty, students and the broader local populace. The programs encompassed a wide array of initiatives, including Online Learning Support, Computer Access and Connectivity, Alcohol Gel Production, COVID-19 Testing Lab, Prophylactic Testing, Support and Resource Allocation, Psychological Support Services, Support for Students, Community Outreach, Support for Isolated Individuals and Continued Community Engagement.

The initiative was not just a project but a movement that touched various aspects of society and the environment. It transformed the campus into a

learning region, open to all. The Science and Higher Education Ministry and the Labor and Social Security Ministry publicly supported the initiative.

Throughout these programs, IPB demonstrated swift adaptation to the pandemic's evolving needs. The Institute extended support to diverse groups while maintaining a broader commitment to community welfare, transcending the scope of activities directly related to COVID-19.

2.4 Program impact

The Academic Volunteering Initiative at the Polytechnic Institute of Bragança (IPB) has had a profound impact on various levels:

Institutional level: The initiative has transformed the academic community, fostering social awareness and transdisciplinary learning. Students, teachers and staff have maintained close relationships through social activities despite the necessary confinement and social distancing. The initiative has provided students with hands-on experience, enhancing their knowledge, skills and competencies in a real-world context.

Local level: The initiative has directly impacted the region and its crisis management. It has increased the participation of civil society in academic activities and the engagement of the academic community. The initiative has also fostered a sense of social responsibility among students and staff, providing them with the opportunity to learn with a purpose and have a real ethical, social, ecological and economic impact.

National and flobal level: The initiative has set a new standard for how academic institutions can respond to crises. By using social needs as an opportunity to increase their impact, academic institutions can play a significant role in crisis management. The initiative's approach of learning by doing and peer-to-peer knowledge sharing could serve as a model for other institutions, potentially leading to a future-oriented renewal of the overall cultural, social and economic structure.

These active measures and multifaceted initiatives undertaken by the Instituto Politécnico de Bragança stand as a testament to its exceptional crisis management strategies. The university achieved remarkable recognition, securing the second position in the Crisis Management category of the prestigious 2023 WURI rankings.[2] The response of the Polytechnic Institute of Bragança to the pandemic has demonstrated the immense potential of adaptability, collaboration and resilience in overcoming challenges and serving the community.

Case 3: The ITHM CARES Program by Far Eastern University (Integrated Care Program)

3.1 Overview of university

Far Eastern University (FEU), located in Manila, Philippines, stands as a prominent private research institution. Established in June 1928 by Dr. Nicanor Reyes Sr., FEU has grown significantly and is widely recognized for its strong emphasis on arts and sciences education.

FEU presently serves a diverse student body of around 40,000, demonstrating its steadfast dedication to quality education through an extensive offering of academic programs, encompassing over 70 undergraduate and graduate programs across diverse faculties and institutes. Notably, the university is known for its dedicated faculty and administrative staff who contribute to its academic excellence.

3.2 Background

The ITHM CARES program at Far Eastern University is a response to the challenges posed by the COVID-19 pandemic, particularly in the tourism and hospitality industry. Recognizing the uncertainties faced by students and potential students regarding their future employability, the program is designed to foster resilience and adaptability.

The program is based on the concept of resilience, which refers to the ability to recover or 'bounce back' from catastrophic events. This concept is particularly relevant to the tourism sector, which has historically demonstrated resilience in the face of wars, natural disasters and virus outbreaks.

ITHM CARES aims to instill this resilience in students, who are the future leaders and game changers of the corporate world. The program seeks to articulate the endless employment and entrepreneurial possibilities that the industry can still provide and offer, especially to potential students from senior high.

3.3 Program overview

ITHM CARES is a program at Far Eastern University that is designed to adapt and transform education amidst the global health crisis caused by the pandemic. The acronym CARES stands for Capacitate Human Resources. Faculty and staff development training was initiated by the Institute to strengthen productivity and efficiency during this health crisis.

Academic Excellence: Webinars were conducted in collaboration with industry partners to replace actual tours, immersions and internships. Virtual activities were conducted for professional courses such as event management, research, entrepreneurship and business planning.

Research Collaborations: Online research lecture series for faculty and students were conducted with esteemed international resource speakers invited. The Institute also co-hosted the 1st Asian Tourism Research Conference.

Enhanced Stakeholders' Engagement: The Institute continued with its articulation programs for its future students, from senior high. Senior High Certification and Articulation programs were conducted to strengthen its admission programs. Industry partnerships remain strong through webinars that were conducted for faculty and students.

Social Responsibility: The Institute is proactive in the continuance of community extension activities. At the start of the lockdown, ITHM conducted a donation drive and distributed food and basic necessities to its students who were stranded in their dormitories.

These programs have been implemented as an adaptive and transformative approach in education amid a global health crisis.

3.4 Program impact

The ITHM CARES program at Far Eastern University has had a significant impact at various levels:

Institutional level: The program has led to the development of faculty and staff through targeted training, enhancing their productivity and efficiency during the health crisis. It has also fostered academic excellence through webinars and virtual activities for professional courses.

Local level: The program has strengthened FEU's engagement with its stakeholders, including future students from senior high. The university also developed a novel program: an online cooking series to showcase the culinary skills and creativity of its faculty. Furthermore, it has maintained strong industry partnerships through webinars.

National and global level: The ITHM CARES program has made strides in research collaborations, including co-hosting the 1st Asian Tourism Research Conference. It has also demonstrated social responsibility through community extension activities, such as donation drives and training programs for the Bureau of Jail Management and Penology (BJMP).

Overall, the ITHM CARES program has significantly contributed to the resilience and adaptability of FEU and its stakeholders in the face of the global health crisis. It has demonstrated a commitment to capacitating its staff, faculty and students, sustaining excellence in education, reinventing research collaborations, enhancing stakeholders' engagement and empowering community extension through social responsibility.

The ITHM CARES program at Far Eastern University has been recognized for its excellence. The university ranked 56th in the top 100 of the WURI rankings and secured eigth position in Crisis Management in the WURI Ranking for 2023, showcasing its resilience and adaptability.

Case 4: Rapid Full-scale Transformation to Hybrid Teaching and Learning by Afeka the Academic College of Engineering in Tel-Aviv (Hybrid Learning Models)

4.1 Overview of university

The Afeka Academic College of Engineering in Tel Aviv ranks among Israel's leading academic institutions of engineering and science, and is accredited by the Council for Higher Education. The college offers five undergraduate programs with 17 fields of specialization, as well as five graduate programs. The college was founded in 1996 and has since graduated over 8,000 bachelor's and master's engineering and science alumni.

Afeka College of Engineering thrives in Tel Aviv, Israel, a bustling city renowned for its entertainment, beaches and tech industry. Positioned within this vibrant urban landscape, the college epitomizes innovation and dynamism. Despite being a smaller institution, this characteristic proves advantageous in swiftly adapting to change.

4.2 Background

The 'Rapid full-scale transformation to hybrid teaching and learning' program was initiated by Afeka College of Engineering in response to the unprecedented challenges posed by the COVID-19 pandemic. The physical campus of Afeka plays a crucial role in the education of its students, providing a platform for developing essential skills like teamwork, creative thinking and problem-solving through experiential learning. However, the pandemic forced academic institutes around the globe, including Afeka, to instantaneously launch full distance-learning curricula, leading to a significant disruption in the traditional educational experience.

Recognizing the importance of preserving the unique Afeka experience, which is highly dependent on engaging and experiential learning, the college decided to leverage the disruptive change brought about by the pandemic to reformulate pedagogical methods. The goal was to create a new type of campus life that could adapt to the restrictions imposed by the pandemic, while still allowing students to interact, participate, learn and become the kind of engineers that Afeka believes in. This led to a rapid full-scale transformation to hybrid teaching and learning, accomplished in three phases.

4.3 Program overview

The 'Rapid full-scale transformation to hybrid teaching and learning' program at Afeka College of Engineering was designed to ensure the continuity and quality of education for its engineering students during a time when in-person classes were not possible due to health and safety concerns. The transformation was accomplished in three phases:

Phase 1: The 'virtual' campus – This phase involved creating a fully synchronous remote teaching environment that mirrored the original class schedule. Each physical room on campus was given a dedicated Zoom address, allowing faculty and students to move between them as they would on the physical campus.

Phase 2: A hybrid model for laboratories – This phase addressed the challenge of conducting laboratory courses remotely. Labs were categorized based on the level of hands-on experience required, and solutions were developed accordingly. For labs that required hands-on experience but could be conducted remotely, specially designed lab kits were sent to students' homes.

Phase 3: Full-scale hybrid teaching and learning – This phase involved a full-scale transformation towards hybrid teaching and learning, equipping all classrooms with the necessary technology for hybrid teaching. This included an array of cameras, microphones, speakers, smart whiteboards, tablets, projectors and an easy-to-use control panel for lecturers.

This program demonstrates Afeka's commitment to providing a high-quality education, regardless of the circumstances, and showcases the college's ability to adapt quickly and effectively to unprecedented challenges.

4.4 Program impact

The 'Rapid full-scale transformation to hybrid teaching and learning' project implemented by Afeka College of Engineering has had a significant impact on multiple levels:

Institutional level: The project has transformed the way education is delivered at Afeka, ensuring continuity and quality of education for its engineering students during the COVID-19 pandemic. It has also demonstrated Afeka's ability to adapt quickly and effectively to unprecedented challenges.

Local level: The project has set a precedent for other educational institutions in the region, showing how they can leverage technology to continue providing high-quality education in the face of disruptions.

National and global level: The success of Afeka's project has been recognized by various bodies in the Israeli education system, and the model could serve as a blueprint for other institutions around the world facing similar challenges.

This project underscores the potential of hybrid teaching and learning models in maintaining educational standards and student engagement during times of crisis. It also highlights the importance of agility and innovation in the education sector. The university ranked fifth in Crisis Management in the WURI rankings in 2022 (ninth in 2021), showcasing its commitment to innovative education.

Case 5: Sustainable, Livable Campus Conducive to Academic Studies by National Dong Hwa University (Faculty Training, Remote Work for Staff, Communication Plans)

5.1 Overview of university

National Dong Hwa University (NDHU) is a national research university located in Hualien, Taiwan. The university's main campus benefits from a unique blend of picturesque landscapes, vibrant indigenous cultures and diverse outdoor activities, reflecting the county's mix of urban and rural characteristics.

Established in 1994, NDHU offers the sixth widest range of disciplines in Taiwan. NDHU is renowned for its liberal atmosphere and is organized into eight colleges, 44 academic departments, and 56 graduate institutes, which enroll about 10,000 undergraduate and graduate students and over 1,000 international students pursuing degrees and joining exchange programs.

5.2 Background

The COVID-19 pandemic began in 2020 and has caused significant disruption worldwide. Given Taiwan's close proximity and extensive social and cultural exchanges with China, where the first COVID-19 case was confirmed, Taiwan was considered a high-risk area. In response, the National Dong Hwa University took proactive steps to implement precautionary and anti-epidemic measures on campus to ensure the health and safety of all professors, staff and students.

5.3 Program overview

National Dong Hwa University has implemented the 'Sustainable, Livable Campus Conducive to Academic Studies' program, spearheaded by President Han-Chieh Chao. This comprehensive initiative, supported by a dedicated team of 837 faculty and staff, focuses on ensuring a safe and conducive academic environment amidst the challenges posed by the COVID-19 pandemic.

The program encompasses a wide range of measures, including the establishment of an Anti-epidemic Zone, the creation of communication groups for faculty and staff, the provision of online studies, and the waiver of accommodation fees during vacations. It also includes the preparation of a quarantine dormitory for students, the implementation of epidemic prevention measures in various campus facilities, and the arrangement of quarantine hotels and transportation services.

All these measures were developed in accordance with the laws, regulations or guidelines announced by the Ministry of Health and Welfare (MOHW). The program has been successful in ensuring that no one at NDHU was infected with COVID-19 in 2020 and in increasing the intake of new international

students. The program has not only ensured the safety and well-being of the NDHU community but has also fostered a friendly atmosphere around the campus.

5.4 Program impact

The 'Sustainable, Livable Campus Conducive to Academic Studies' project at National Dong Hwa University has had substantial impacts at various levels:

Institutional level: The project successfully created a safe and conducive environment for academic studies at NDHU during the COVID-19 pandemic. It has fostered a sense of community and provided students with practical opportunities to apply their learning, such as in the design of automatic temperature equipment.

Local level: The project has significantly contributed to the health and safety of the local community by implementing comprehensive COVID-19 prevention measures. This has helped to control the spread of the virus in the local area. The project has also supported local businesses, such as quarantine hotels.

National and global level: The project at National Dong Hwa University has set a national example of effective pandemic response in educational institutions, recognized by the Ministry of Education's request for university staff assistance at Taoyuan International Airport. Internationally, it has facilitated the sustained progression of education through online courses and dedicated student support, underscoring the university's commitment to education and establishing a benchmark for global pandemic management in academic institutions.

National Dong Hwa University's comprehensive precautionary and anti-epidemic measures for COVID-19 have significantly enhanced campus safety and communication efficiency. The university's international cooperation efforts, such as delivering face masks to sister universities like Navajo Technical University (US) and the Maori community in New Zealand, have extended its impact globally. These efforts have not only safeguarded the university community but also contributed to its global recognition, as evidenced by its 11th ranking in the 2022 WURI Ranking in Crisis Management, and 89th position in the WURI rankings 2023 global top 100, showcasing the university's effective response to global challenges and commitment to academic excellence.

Case 6: COVID-19 Digital Stethoscope by Telkom University (Quarantine Facilities / Social Distancing Measures)

6.1 Overview of university

Telkom University, a private institution situated in the suburban area of Bandung Regency, West Java, Indonesia, encompasses a vast campus spanning

48 hectares (120 acres). Driven by a strong commitment to 'Creating the Future', it has consistently been acknowledged as the top private university in Indonesia and has secured its place among the country's finest educational institutions. The university hosts a diverse student body of approximately 35,000 students and is supported by a dedicated academic staff of over 1,000 individuals. Established on August 14, 2013, Telkom University was formed through the merger of four institutions under Telkom Indonesia, facilitated by its education-focused wing, the Telkom Education Foundation (now the Telkom Foundation).

The university's commitment to research is evidenced by its contributions to over 4,000 Scopus-indexed journals. This dedication to research and development underscores Telkom University's commitment to advancing knowledge and innovation. This esteemed institution remains dedicated to shaping the future, offering master's and doctoral degree programs that nurture each student toward success.

6.2 Background

Telkom University has developed a remote-operable digital stethoscope named 'Telestethoscope' to mitigate the risk of COVID-19 transmission. This innovation enables real-time auscultation of a patient's heart and lung sounds, thereby bolstering the national innovation system through academic-industry cooperation to create globally competitive products. In the context of physical distancing, Telkom University's prototype of the digital stethoscope allows remote operation, reducing the risk of COVID-19 and other virus exposure. Named the 'Telestethoscope' for its capacity to auscultate the sounds of a patient's lungs and heart in real-time from a distance, this development significantly contributes to strengthening the national innovation system. It emphasizes the importance of research processes and outcomes that foster collaboration between academia and industry, ultimately resulting in the creation of new globally competitive products.

6.3 Program overview

The team at Telkom University has developed a digital stethoscope prototype capable of remote operation, with the primary aim of mitigating the risk of COVID-19 transmission among medical personnel and doctors. Led by Dr. Satria Mandala, a team of eight members from Telkom University spearheaded the development of this innovative prototype named 'Telestethoscope.' The project was conducted in collaboration with Hasan Sadikin Hospital, Saiful Anwar Hospital, Brawijaya University and Padjadjaran University, receiving financial support from a public service agency under the Ministry of Finance of Indonesia. The 'Telestethoscope' facilitates remote real-time auscultation

of a patient's heart and lung sounds, marking a substantial advancement in the era of physical distancing.

The development process encompassed enhancements in hardware and software, incorporating Bluetooth-based data communication for energy efficiency and upgrading servers to manage extensive patient data. The project demanded expertise in biomedical engineering, medicine, programming and hardware design. It leveraged resources such as a data processing server, IoT MQTT messaging, a smartphone router, Bluetooth low energy and a Stethoscope Sensor Data Acquisition Unit (DAU).

Software development involved the utilization of wavelet and server software. This innovative approach, distinct from traditional methods, integrated Bluetooth Low Energy (BLE) into the telemedicine system's design, configuration and execution, employing a load distribution method on the telemedicine system server. The 'Telestethoscope' signifies a significant contribution to telemedicine, providing a practical solution for remote healthcare delivery amid the COVID-19 pandemic. This groundbreaking device, dubbed the 'Telestethoscope,' permits real-time auscultation of a patient's heart and lung sounds from a distance, marking a significant breakthrough in maintaining physical distancing protocols.

6.4 Program impact

The COVID-19 Digital Stethoscope project by Telkom University has had a profound impact on various levels:

Institutional level: The project has significantly contributed to Telkom University's reputation for innovation and excellence. It showcases the university's commitment to leveraging technology to address pressing global challenges.

Local level: The project has enhanced healthcare delivery by providing a practical solution for remote auscultation, thereby reducing the risk of COVID-19 transmission among healthcare workers and patients.

National and global level: The project has demonstrated the potential of digital health solutions in responding to global health crises. By enabling real-time, remote auscultation of heart and lung sounds, the project has shown how technology can be leveraged to improve patient care and protect healthcare workers in the context of a pandemic.

The COVID-19 Digital Stethoscope project at Telkom University has not only significantly contributed to the university's standing as a leading institution for innovation but also made a substantial impact in the broader field of digital healthcare. This project's excellence has been recognized in the WURI rankings for 2023, where the university secured 54th position in the top 100 and seventh position in Crisis Management, further highlighting the university's commitment to addressing global challenges through innovative solutions.

Case 7: Crisis Management System for Students During the Pandemic by Incheon National University (Integrated Care Program)

7.1 Overview of university

Incheon National University (INU) is a prestigious institution located in the vibrant city of Incheon, South Korea. INU was first founded as a private college known as the Incheon Technical College in January 1979, and in 2013, it was established as an incorporated flagship National University. The university is home to nearly 14,000 enrolled students and 500 full-time faculty members across three campuses. It also has an administrative staff of 6,833. INU comprises 12 faculties.

7.2 Background

The project 'Crisis management system for students during the pandemic' at Incheon National University was initiated in response to the increasing severity of mental health issues, such as depression and suicide, among university students. The COVID-19 pandemic has engendered widespread fear and anxiety across the globe, and university students are no exception. The abrupt transition to online learning, isolation and the general uncertainty of the situation have added to the stress and anxiety of students.

Recognizing these challenges, the university decided to take proactive steps to support its students. The project aims to identify high-risk groups early and provide them with the necessary support. This includes operating a crisis prevention program for the safety and protection of all university members.

The goal is to systematize the crisis management system, ensuring that help is readily available for those who need it. This initiative underscores the university's commitment to the well-being of its students, faculty and staff during these challenging times. It is a testament to the university's dedication to fostering a supportive and inclusive environment for all its members (Cho, et al., 2020).

7.3 Program overview

The project 'Crisis management system for students during the pandemic' at Incheon National University, is a comprehensive effort to address the psychological stress caused by COVID-19 among university students. The team, consisting of five members, has been allocated a budget of over 10 million KRW for this initiative. The project aims to alleviate the increased sense of isolation due to mask-wearing and social distancing measures. The project is structured into three stages: Prevention, Discovery and Support.

Prevention stage: This stage focuses on education to prevent psychological crises. It involves the creation and distribution of manuals for crisis prevention and promotional materials about crisis management.

Discovery stage: This stage involves special lectures on understanding suicide, and student counseling techniques for professors. It also includes lectures on psychological crisis situation awareness for faculty and staff. Additionally, tests are conducted on new students to assess their adaptation status and competency.

Support stage: At-risk students are provided with psychological counseling. The university has signed a business agreement with a specialized agency and offers financial support for hospital expenses for high-risk students.

In contrast to traditional approaches, this initiative offers systematic support from prevention to intervention for psychological difficulties by building a customized system tailored to the unique challenges of the pandemic, ensuring comprehensive assistance for university members.

7.4 Program impact

The 'Crisis management system for students during the pandemic' project at Incheon National University has had a significant impact at various levels:

Institutional level: The project has provided comprehensive support to students, faculty and staff at the university. It has helped in the prevention of university crises by strengthening crisis awareness and response capabilities so that university members can effectively cope with psychological and emotional difficulties.

Local level: The project has had a significant impact by establishing business agreements with various local organizations. These collaborations have helped in providing more localized and effective support to the students. The project has also been recognized by local authorities for its mental health support efforts, increasing confidence in the university within the local community.

National and global level: The 'Crisis management system for students during the pandemic' project at Incheon National University has been recognized at both the national and global levels. Nationally, the project has been acknowledged by the Ministry of Education for its mental health support efforts, which have bolstered confidence in the university. It has also fostered various agency business agreements for crisis management, aiding in the provision of more localized and effective support to students. Globally, the project's innovative approach to managing student crises during the pandemic has garnered recognition.

The university's innovative approach to managing student crises during the pandemic has been recognized widely. Incheon National University ranked 18th in the top 100 of the WURI rankings for 2023. Furthermore, the university secured ninth position in the Crisis Management category of the WURI rankings, showcasing its resilience and adaptability in these challenging times.

CONCLUSION

As we reflect on the multifaceted responses of higher education institutions to the COVID-19 pandemic, a common thread emerges: the remarkable adaptability and innovative spirit of universities in the face of adversity. These case analyses provide compelling evidence of the crucial role that universities play not just as educational institutions, but as pillars of resilience in their communities and beyond.

The University of Mostar's strategic deployment of e-learning platforms, IPB's volunteering initiative, FEU's ITHM CARES program, Afeka's rapid transition to hybrid learning, USJ's humanitarian projects, NDHU's sustainable campus strategies, Telkom University's telemedicine breakthrough, and INU's holistic crisis management system exemplify a broad spectrum of successful responses to a global crisis. These institutions have demonstrated that with swift action, creative problem-solving and collaborative efforts, universities can not only continue to fulfill their educational missions but also expand their societal impact.

The pandemic has underscored the essentiality of higher education institutions as agile and responsive entities capable of leading through crises. As we emerge from the pandemic's shadow, it is clear that the experiences gained have left an indelible mark on the academic landscape. The transformations undertaken by these institutions have not been mere stopgap measures but are evolving into enduring components of their operational frameworks. This evolution points toward a future where the integration of technology in education, the emphasis on mental health, and a commitment to societal engagement become standard features of the higher education experience.

Furthermore, the recognition of these universities in the WURI rankings is a testament to their innovative approaches and the effectiveness of their crisis management. As we look toward the future, these case studies serve as a repository of best practices for universities worldwide.

In conclusion, the COVID-19 pandemic has been a litmus test for the robustness and relevance of higher education. The lessons learned from these diverse case studies are invaluable; they highlight the importance of preparedness, the potential for transformation, and the unyielding commitment of academic institutions to serve and lead in times of global crisis.

NOTES

1. The case abstract of Instituto Politécnico de Bragança can be found on the following website: https://docs.google.com/spreadsheets/d/1XqQI_Qqdi4Dv0oL2HN3bJ7JUY-hGUpOm/edit#gid=663292894

2. The 2023 WURI ranking in Crisis Management of the Instituto Politécnico de Bragança is shown on the following website: https://www.wuri.world/2023-top-50-crisis-management

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