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Management and university organization to face the COVID-19 pandemic. Contributions from a public university in Colombia

Cristian Bedoya Dorado
Universidad del Valle, Colombia
bedoya.cristian@correounivalle.edu.co

Guillermo Murillo-Vargas
Universidad del Valle, Colombia
guillermo.murillo@correounivalle.edu.co

Carlos Hernán González-Campo
Universidad del Valle, Colombia
carlosh.gonzalez@correounivalle.edu.co

Abstract. This article analyses the management of a public university in Colombia during the initial stages of the COVID-19 pandemic in 2020. The case study method was used to identify the strategies the institution implemented to deal with the crisis via its planning, academic management, administrative management, welfare management, research management, and extension areas. The results show that the configuration of university management was mainly oriented towards assuring the processes of teaching and learning assisted by technology, supporting students economically and psychologically in conjunction with other public entities, and weathering the national crisis through academic research and knowledge creation.

Keywords: university management, COVID-19, pandemic, universities, Colombia.

1. Introduction

The pandemic stemming from the SARS-CoV2 virus, which causes the disease known as COVID-19, is perhaps one of the most disruptive events in recent human history (Brammer & Clark, 2020; Regehr & Goel, 2020). The actions taken by governments to prevent and contain the pandemic, such as the closure of businesses and other organizations, disrupted various social dynamics—especially those that involved the physical presence of large numbers of people. In other cases, in-person activities had to migrate to online formats; examples include remote working and education supported by information and communications Technologies (ICTs) (Cheng et al., 2020).

When it came to the higher education sector, higher education institutions (HEIs) faced the immediate challenge of continuing with their teaching, research, and extension activities through remote learning and working modalities supported by ICTs, but at the same time they had to deal with different challenges associated with these new approaches (Bao, 2020; Cicha et al., 2021; Mahmood, 2021). For those HEIs previously unacquainted with virtual education, this marked a shift from the classroom to ICT-assisted learning, which involved a transformation of traditional work and learning models to others based on connectivity and physical remoteness (Brammer & Clark, 2020; Izumi et al., 2021; Tesar, 2020).

This change of teaching model has been one of the main challenges for HEIs, in that teaching processes carried out through ICTs depend on variables such as the technology infrastructure (Ebner et al., 2020; Shenoy, Mahendra, & Vijay, 2020; Sulisworo, Astuti, & Fatimah, 2020), educators' levels of training and skills for virtual education (Crawford et al., 2020; Johnson, Veletsianos, & Seaman, 2020; Marek, Chew, & Wu, 2021; Mishra, Gupta, & Shree, 2020; Watermeyer et al., 2021), and students' access to connectivity and ability to adapt to the new learning modalities (Crawford et al., 2020; Izumi et al., 2021). In many countries this challenge was compounded by financial difficulties associated with the economic instability trigged by the pandemic, which resulted in a drop in student enrollment along with the spiraling unbudgeted costs of managing the crisis (Crawford et al., 2020; Izumi et al., 2021). Thus, as well as a public health crisis, the pandemic is also acknowledged as a social and economic crisis (UNESCO, 2020).

HEIs also had to implement biosecurity measures to assure in-person activities and prepare for the return to the classroom, in line with governmental provisions (Cheng et al., 2020; Regehr & Goel, 2020; Wang et al., 2020), while also supporting the physical and mental health of their educators, students, and workers (Cheng et al., 2020; Izumi et al., 2021).

These institutions joined forces with other institutions and organizations to tackle the challenges that have arisen in the health, economic, and social spheres (Bedoya-Dorado, Murillo-Vargas, González-Campo, 2021; BID, 2020; UNESCO, 2020).

Although prior research has explored the impact of the COVID-19 pandemic on HEIs and the associated challenges and transformations (Brammer & Clark, 2020; Cheng et al., 2020; Sobaih, Hasanein, & Elnasr, 2020; Sulisworo et al., 2020; Watermeyer et al., 2021), few studies have analyzed the role of university governance in responding to this situation (Barquero-Cabrero et al., 2020; Bedoya-Dorado et al., 2021; Corral, Izurieta, & Macías, 2020; Crawford et al., 2020; Izumi et al., 2021; Mahmood, 2021; Regehr & Goel, 2020). Such an inquiry requires an examination of university management's composition that takes into account the substantive functions of HEIs; the public health, social, and economic challenges; and the urgent need to migrate to virtual work and learning environments.

While some countries have prior experience in ICT-assisted learning following epidemics, natural disasters, or social crises, others, such as Colombia, are embracing this modality for the first time (Regehr & Goel, 2020). Moreover, Colombia lags behind in terms of technological development, and much of its population has limited access to the internet—a situation compounded by an economic crisis whose effects extend to the education sector (National Accreditation Council [CNA], 2020; DANE, 2018; Semana Magazine, 2021).

This paper describes and analyzes the governance of one of the most prominent public research universities in Colombia at the height of the pandemic in 2020. It employs the case study method, drawing on documentary analysis and semi-structured interviews with university administrators as instruments. This study also analyzes the challenges associated with the pandemic, the actors involved in crisis planning and response, and the dimensions and areas on which the various university governance strategies focused.

For the purposes of the present study, "university management" refers to the management of a set of financial, material, technological, and information resources, processes, and results in pursuit of the efficient discharge of teaching, research, and extension responsibilities in line with institutional goals and the needs of society under the applicable regulatory framework (Aguilera, 2006; Cejas & Alfonso, 2012; Meléndez, Solís, & Gómez, 2010). Given the focus on the COVID-19 pandemic, the study takes into account the guidelines proposed by Regehr and Goelb (2020), who incorporate the need to plan crisis and emergency situations into the notion of university

management. This implies the establishment of policies and strategies that articulate protocols and procedures for operation within the framework of contingency scenarios. Likewise, it was considered important to focus on the digital transformation processes that authors such as Corral, Izurieta and Macías (2020) have described as "e-governance strategies"; these not only add value to the HEIs' essential functions by harnessing ICTs but also constitute management strategies for transformation based on greater efficiency and quality (Corral et al., 2020), while also allowing the essential functions of university management to continue under a new reality (Barquero-Cabrero et al., 2020).

The case studied here is the Universidad del Valle, a public university founded in 1945. It is one of Colombia's most prominent universities and one of only 15 to be granted "high quality" institutional accreditation by the National Ministry of Education (MEN). Its main campus is located in the city of Santiago de Cali, known in Colombia as "the university city," and there are nine more campuses in different municipalities of the Valle del Cauca Department as well as the northern part of the Cauca Department. Overall, the university has more than 30,000 students enrolled in its 21 technological education programs, 63 degree programs, 51 university and clinical specializations, 16 master's programs, and 20 doctoral programs (Universidad del Valle, 2020). Universidad del Valle is a leader in southeast Colombia in the fields of teaching and research, and since its creation it has been a strategic partner and a pioneer in knowledge creation for regional development. The university has agreements and alliances with different national and international agencies, institutions, and organizations (Universidad del Valle, 2020).

This article is organized into six sections. In the second, the methodology of the case study is explained. The third section provides a review of the beginning of the pandemic in Colombia and the university's crisis planning. Next, the implementation of the university's pandemic planning and management is described. A description of the results follows in section five. Finally, in the sixth section, final considerations and suggestions for future lines of research are presented.

2. Methodology

This study employs the qualitative case study method (Yin, 1989). The aim of this method is to investigate a phenomenon within a real environment. The approach is used for the study of single entities and can employ a wide range of data collection and analysis methods. The main focus is the unit of analysis, or the case, which entails examining how its limits are defined and

the manner in which it naturally occurs (Yin, 1989). In this study, the unit of analysis is the management of Universidad del Valle from the beginning of the pandemic, in March 2020, until July 2021.

The data collection strategies used were semi-structured interviews and documentary research. The interviews were carried out with seven administrators who together occupied the university's senior management posts during the pandemic. The purpose was to inquire into the main challenges they faced during this period in discharging their responsibilities or managing their areas, the results they obtained, and the changes that resulted. Table 1 presents information about these participants.

Table 1
Participants and responsibilities of each position or area

Participants	Position	Responsibilities of position or area
P1	Rector	- Legal representative. - Executive authority. - Oversees the university's overall operations and leads its administrative processes. - Others.
P2	Academic vice-rector	- Leads the management of academic processes, including self-assessment and program quality. - Others.
P3	Administrative vice-rector	- Leads the management of administrative and financial process. In charge of the areas that support fulfillment of the university's essential functions. - Others.
P4	Vice-rector for research	- Leads management of processes involving research, knowledge creation and transfer, innovation, and artistic creation. - Leads management of research projects with internal and external financing. - Others.
P5	Vice-rector for university welfare	- Leads the university welfare process, which is recognized as an essential function given its impact on the academic community. - Responsible for community services such as media, dining, sports activities, socioeconomic assistance, among others.
P6	General secretary	- Oversees support for the university governance bodies (university council and academic council). - Supports the public dissemination of records, agreements, and resolutions issued by the governance bodies and the rector's office.
P7	Head of the planning and institutional development office	- Leads the planning and institutional development office. - Oversees areas related to strategy, risk, project management, statistics and information, and quality management. - Others.

Source: Compiled by authors based on institutional information.

The documentary research involved consulting university management reports, news related to pandemic management, and the policies and resolutions approved from March 2020 until June 2021. The data was obtained and systematized for analysis, and then compared with that provided by the participants in the semi-structured interviews.

The following table presents the data that formed the basis of the analysis:

Table 2
Material for analysis

Unit/entity/body	Document	Year
University Council of Universidad del Valle	Record No. 07 of the University Council	2020
	Record No. 08 of the University Council	2020
National Accreditation Council (CNA)	*La alta calidad de la educación superior en tiempos de pandemia*	2020
University Council of Universidad del Valle	Resolution No. 020 of the University Council	2020
National Ministry of Education (MEN)	Directive No. 02; March 19, 2020	2020
	Directive No. 04; March 22, 2020	2020
	Directive No. 08; April 6, 2020	
Office of the President	Decree No. 417; March 17, 2020	2020
	Decree No. 457; March 22, 2020	2020
Office of the Rector of Universidad del Valle	Rectoral Resolution No. 1,012	
	Rectoral Resolution No. 1,012	
Office of the Vice-Rector for University Welfare at University del Valle	*Informe de gestión*	2020

Source: Compiled by authors.

The data was analyzed using the qualitative content analysis technique. This allowed for a systematic description of the texts for interpretation by theme, content, concepts, meanings, and implications (Cáceres, 2003). The analysis focused on university management at the beginning of the pandemic, and as it unfolded. The aim was to identify the challenges imposed by the pandemic across its different dimensions, the actors involved, and the university management strategies and actions that allowed its essential functions—encompassing the welfare, research, administrative and financial, academic, and community relations management areas—to continue.

Table 3 presents the categories and subcategories of analysis.

Table 3
Categories and subcategories of analysis

Categories	Subcategories
Crisis planning and outbreak	- Pandemic challenges - Actors
University management and implementation	- Dimensions of the pandemic - Strategies and actions by areas of university management

Source: Compiled by authors.

3. Context of the pandemic and crisis planning in Colombia

On March 12, 2020, the day after the WHO declared the global COVID-19 pandemic caused by the SARS-CoV2 virus (OMS, 2020b), Colombia's Ministry of Health and Social Protection announced a public health emergency throughout the country, adopting various measures to contain the spread of the virus and continue providing public services. These included the introduction of a raft of technological tools to prevent public gatherings and ensure social distancing, such as ICTs to enable work from home; live broadcasting and streaming of events such as conferences, forums, or talks; electronic platforms for communications; and the use of e-learning platforms, social media, knowledge portals, and other remote systems in institutional processes.

Then, on March 17, 2020, Colombia's president declared a nationwide state of economic, social, and ecological emergency, marking the official start of the pandemic in the country. On this basis, on March 22 the MEN asked all HEIs to design plans and strategies to facilitate the development of virtual programs and the transition away from on-campus activities.

Before the president's declaration of a full state of national emergency, Universidad del Valle had already started its own crisis planning for the pandemic: on March 12, the university declared its own state of "manifest urgency" (*urgencia manifiesta*)[1] as a preventative measure, and three days later, on March 15, it opted to suspend in-person classes and migrate to the ICT-assisted modality.

Since its foundation, Universidad del Valle has provided higher education services by way of the in-person model, and so when the pandemic broke out it did not have the physical or technological infrastructure necessary

1 In the event of a natural disaster, Colombia's public institutions can unilaterally declare this state in order to adapt their management processes accordingly.

to implement the virtual education models that the government called for. That semester, the university had 12,282 students enrolled in its undergraduate programs, most of whom belonged to socioeconomic strata 1 and 2, the lowest of Colombia's six official socioeconomic categories, as well as another 3,003 students on graduate programs (Universidad del Valle, 2020). On March 17, the university determined the need to implement measures aimed at curbing transmission of the coronavirus. That is, the institution established a policy with which to respond to the crisis and assure its essential functions. The university's administrators therefore set out to tackle certain questions, such as: How can the university ensure that its biosecurity measures are in accordance with those required by the national and departmental governments as well as international agencies? How can academic, administrative, and research activities continue through virtual systems? In this context, the pandemic threw up challenges for the institution's various areas and units. The following table presents some of the challenges stemming from the university's directives.

Table 4
Challenges posed by the pandemic

Type of challenge	Challenges and administrators responsible
Challenges associated with biosecurity measures	- Isolation and confinement of the university community (P3, administrative vice-rector) - Prevention of transmission (P1, rector). - Identifying the general health conditions of the academic community in relation to risk factors such as age, comorbidities, mental health, and others (P2, academic vice-rector). - Providing remote welfare services to help students sustain their living conditions during the pandemic, including sports activities (P5, vice-rector for university welfare). - Implementing psychological and emotional support services through online and telephone sessions (P5, vice-rector for university welfare). - Assuring occupational health and safety amid the shift to working from home (ergonomics, active breaks, flexiwork etc.) (P5, vice-rector for university welfare).

Providing ICT support for academic, administrative, and research activities.	- Conducting the technological adaptation of the university's services following the closure of the campus (P3, administrative vice-rector). - Ensuring the necessary conditions for the connectivity of students and professors (P5, vice-rector for university welfare). - Identifying needs for the current semester with reference to the number of courses and students in prior semesters (P2, academic vice-rector). - Analyzing the socioeconomic conditions of students attending classes remotely from different parts of Valle del Cauca and elsewhere (P5, vice-rector for university welfare). - Addressing uneven application of virtual education throughout the university (P1, rector). - Overcoming lack of support among faculty for TIC virtual education systems (P1, rector). - Maintaining and improving education quality through virtual environments (P1, rector). - Replicating the theoretical–practical training required for laboratory work and internships (P2, academic vice-rector). - Planning and managing the installed capacity of laboratories and centers, taking into account the needs of researchers to respond to local and global challenges related to the pandemic (P4, vice-rector for research). - Prioritizing issues related to the social appropriation of knowledge and developing public–private partnerships to implement the results of ongoing research projects (P4, vice-rector for research). - Continuing with project management processes—hiring, procurement, imports, and so on—to respond to the needs of groups of researchers in the context of the restrictions imposed by the pandemic (P4, vice-rector for research). - Identifying members of the university community who were outside the city or country or intended to leave, ascertaining their circumstances, and either planning for their return or making provisions for them to stay in place (P2, academic vice-rector). - Working with the rector's office and other university units to assess short- and medium-term actions (P2, academic vice-rector). - Keeping the university community informed with reliable, up-to-date information (P6, general secretary). - Coordinating work teams to address the needs of each unit in the transition to remote working (P7, head of planning and institutional development office). - Coordinating and articulating with other universities and the MEP (P7, head of planning and institutional development office). - Implementing digital signature systems as part of the transition to virtual processes and procedures (P6, general secretary).

Source: Compiled by authors.

After identifying challenges, the university management proceeded to define strategies and measures through which to discharge its essential functions and operate its various units. This meant a process of adapting to changing conditions (P3, administrative vice-rector) and a financial strategy for targeting approved budgetary items towards the immediate needs arising from the pandemic (P1, rector).

To this end, systems were acquired to perform signature digitalization processes securely and reliably, while certain processes that were formerly in-person, such as elections for collegiate bodies, became virtual (P6, general secretary). For the most part the university opted for remote working, which necessitated training for administrative staff, professors, and students, as well as strengthening technological capabilities and introducing flexibility in the organization of work (P2, academic vice-rector; P3, administrative vice-rector).

The occupational health and human resources divisions concentrated on acquiring disinfectants, formulating preventative protocols for employees who had arrived from abroad or had been in contact with others who had done so, and implementing 15-day isolation periods for those with symptoms (P5, vice-rector for university welfare).

The use of air conditioning was prohibited in all office areas, in line with WHO recommendations (2020a). Plans were put in place to communicate the preventative protocols in an effort to promote self-care as one of the most effective ways of containing the spread of the virus. Other measures for reducing face-to-face contact included a reduction in administrative procedures and the provision of telephone lines to facilitate those that remained.

The university's administrators collaborated with the ICT and library areas to establish approaches for proceeding with virtual classes. This involved evaluating the university infrastructure to ensure the availability of the technological resources and platforms necessary for virtual classes; notable examples included the university's virtual campus platform and Google Meet.

Having identified a lack of internet access among students, the university initiated a strategic partnership with a telephone company for the bulk acquisition of SIM cards with data plans for cost-free distribution among students in need (P1, rector; P2, academic vice-rector). The library also planned different virtual training programs focusing on online access to bibliographic resources. For adaptation and migration to virtual classes, three lines of support were proposed. These were (1) management of technological adaptation; (2) pedagogical orientation for the use of virtual environments and technologies; and (3) support for professor–student interaction. Although the university was already working on the development and adaptation of third-party technologies, all courses were to be created on the university's virtual campus platform.

All courses whose practical and laboratory components required physical attendance were suspended, along with field trips. The only exceptions were rotations by health faculty interns and residents, who were needed to support the Hospital Universitario del Valle in responding to the pandemic.

To comply with physical distancing protocols and guidelines, the decision was made to suspend visits by international professors as well as applications from the university's own professors to travel abroad (P2, academic vice-rector). Moreover, research projects with in-person data-gathering techniques were required to suspend these processes or adapt them to virtual formats.

Likewise, training processes for researchers related to international sources of financing were developed with a view to obtaining resources from different regions, particularly Europe, the United States, and Canada. This extra financing meant projects of broader coverage and scope (P4, vice-rector for research).

Some of the university's faculties, in line with their areas of knowledge, supported the production of gels and alcohol for disinfection protocols, epidemiological assessments, and communications to the region's inhabitants about the state of emergency (P2, academic vice-rector).

4. University pandemic management and implementation

From March 17, the university's undergraduate and graduate programs migrated to the ICT-assisted modality, supported by technological tools and platforms, training programs for students and professors, and institutional support in terms of connectivity and financial aid. Moreover, given the public health emergency, most university welfare programs transitioned to a virtual format, while renewed emphasis was placed on the physical and mental health of the university community (P1, rector; P2, academic vice-rector; P5, vice-rector for university welfare). Thus, efforts were combined among the academic, administrative, and welfare areas.

Partnerships and cooperation were coordinated between different actors with the aim of setting up special funds to finance or otherwise support students at risk of dropping out due to financial difficulties. In this case, the university supported students through donations under a sponsorship model that covered the costs of enrollment, books, and connectivity devices (P1, rector; P5, vice-rector for university welfare).

The welfare management area also supported students at the different university sites through subsidies, food scholarships, and food aid (P2, academic vice-rector; P5, vice-rector for university welfare). Some of the subsidies were intended for tuition fees and medical expenses. In 2020, the university approved its *Matrícula Cero* (Zero [Cost] Enrollment) program, whereby students from strata one and two received scholarships that covered all their enrollment costs, and students from stratum three received a 30% discount (P5, vice-rector for university welfare).

To assure students' connectivity as well as the continuation of their academic programs, the university organized activities such as a strategic partnership with two mobile network operators for the purchase of computers, tablets, and SIM cards with data plans for donation to students who had difficulty attending classes remotely (P1; rector; P5; vice-rector for university welfare). This campaign prioritized students according to their socioeconomic strata, whether they were from ethnic minorities or members of the LGBTIQ community, whether they lived in rural areas or municipal capitals, and whether they were already state beneficiaries (vice-rector for university welfare, 2020). Virtual activities oriented towards promoting physical and mental health focused on the likes of arts and handicrafts, personal growth, physical activities, work planning, and virtual consultations. Where necessary, home visits were made, with virtual monitoring. Because of the mandatory social isolation measures and their consequences for mental health, the university strengthened its psychosocial support program, intended to assist members of the university community with emotional crises stemming from anxiety, stress, loss of family members or other loved ones, relationship breakups, use of psychoactive substances, and family abandonment (P1, rector; P5, vice-rector for university welfare).

The creation of the COVID-19 biological risk epidemiological surveillance program enabled the identification, monitoring, and support of members of the university community who had been or may have been infected. Meanwhile, medical surveillance was conducted through telemonitoring. This program was accompanied by campaigns focusing on ways of preventing COVID-19 infection and the provision of glycerin alcohol hand sanitizers. Likewise, cleaning, disinfection and self-care campaigns were carried out in the different workplaces (P5, vice chancellor for university welfare).

In addition to such campaigns, training was provided on biological risk, biosecurity, and correct use of personal protective equipment for workers in the health services, restaurant, and security and surveillance industries, among others. The guidelines of the Ministry of Health and Social Protection and the occupational risk insurers' biosecurity protocols (Resolución No. 0666 of 2020) were incorporated into the epidemiological surveillance program, and infographics produced for their dissemination. This resulted in the updating of the university's biosecurity manual to minimize the risk of COVID-19 transmission, as well as its distribution to all the university's sites and units.

Other measures and protocols were documented to assure their proper application and likewise disseminated throughout the university community. These included the conditions and stipulations related to the resumption

of in-person activities, admission of employees to the campus, access monitoring and surveillance activities, measures to prevent face-to-face user service, equipment disinfection and cleansing, COVID-19 monitoring checklists, and so on. There were also tetanus and flu vaccination sessions for employees from different areas.

The university's Microbiology Laboratory was approved by the National Health Institute for the processing of COVID-19 tests. The acquisition of new equipment made it possible to increase the number of tests to support the identification of cases in Cali and other neighboring municipalities. Moreover, healthcare professionals in Valle del Cauca and elsewhere were trained and updated on taking samples, handling intensive care, and other aspects associated with the pandemic. In conjunction with the university hospital, intensive care beds, ventilators, and medical supplies were purchased (P1, rector; P2, academic vice-rector). This process, the outcome of an interinstitutional partnership between the university, the Valle del Cauca government, and the Cali mayor's office, also benefited the community.

Some of the university's research groups took part in a call for proposals to address different problems associated with the pandemic financed by the Ministry of Science, Technology and Innovation. Moreover, the university organized an internal call for research projects intended to contribute to the body of knowledge about COVID-19 and to help mitigate its effects.

The table below shows how university management was oriented towards different dimensions of the pandemic, such as public health, the economic situation, virtual education, and community support. Addressing these dimensions required a range of complementary strategies and actions oriented towards specific actors, formulated and implemented through the university's different functional areas.

Table 4
Dimensions of the COVID-19 pandemic and university management

Dimension	Actors	Strategies and actions	University management area
Health	- Students - Professors - University administrators - Employees (administrative and other services)	- Acquisition of disinfectant products (antibacterial soaps and gels). - Formulation of preventative protocols for employees returning from abroad or who came into contact with others who had. - Preventative isolation protocols for employees with symptoms associated with COVID-19. - Implementation of the disinfection and cleansing plan with specialized products and vaporizers. - Establishment of email and telephone channels for concerns associated with the virus. - Ban on the use of air conditioning in university facilities. - Reduction of red tape to minimize face-to-face contact. - Implementation of remote working. - Suspension of in-person classes, and postponement of in-person practical and laboratory components. - Cancellation of visits by international professors and trips and commissions by university professors. - Suspension of non-urgent medical services, such as dentistry. - Creation of virtual programs related to arts and handicrafts, personal growth, consultation, etc. - Strengthening of the psycho-social support program. - Creation of epidemiological surveillance program to monitor biological risks of COVID-19. - Design of training on biological risk, biosecurity, and use of personal protective equipment. - Updating and dissemination of biosecurity manual.	- Administrative management - Welfare management - Research management
Financial situation	- Students	- Continuation of monitoring programs (economic aid) for students. - Development of partnerships and cooperation to support and finance students. - Creation of *Matrícula Cero* student scholarship program.	- Welfare management - Welfare management

Administrative management	- Students - Professors	- Determination of technological platforms and resources to be used for providing virtual classes (university's virtual campus and Google Meet). - Implementation of synchronous and asynchronous classes. - Training programs on online access to bibliographic resources. - Training programs on use of virtual platforms. - Establishment of three lines of support: - (1) management of technological adaptation; (2) pedagogical orientation on use of virtual technologies and environments; and (3) support for professor--student interactions. - Change from quantitative to qualitative assessment. - Establishment of campaigns for donating computing equipment. - Creation of a strategic partnership for the distribution of computers, tablets, and SIM cards with data plans for students with difficulties connecting.	- Academic management - Administrative management - Welfare management
Community support	- University community - Wider community (Cali, Valle del Cauca, Colombia)	- Continuation of rotations by Health Faculty interns and residents to support Hospital Universitario del Valle. - Manufacture of gels and alcohols by Chemical Engineering program for disinfection protocols. - Support from the Health Faculty in giving advice on epidemiological matters and setting up a technical team for the municipal health department. - Support for test processing to detect COVID-19 infections. - Formulation of a research project for identifying the effects of mobility on the spread of the coronavirus, and planning and acting accordingly. - Launch of an internal call for proposals for research projects aimed at advancing knowledge and mitigation of the effects of the pandemic.	- Academic management - Research management - Community relations management

Source: Compiled by authors.

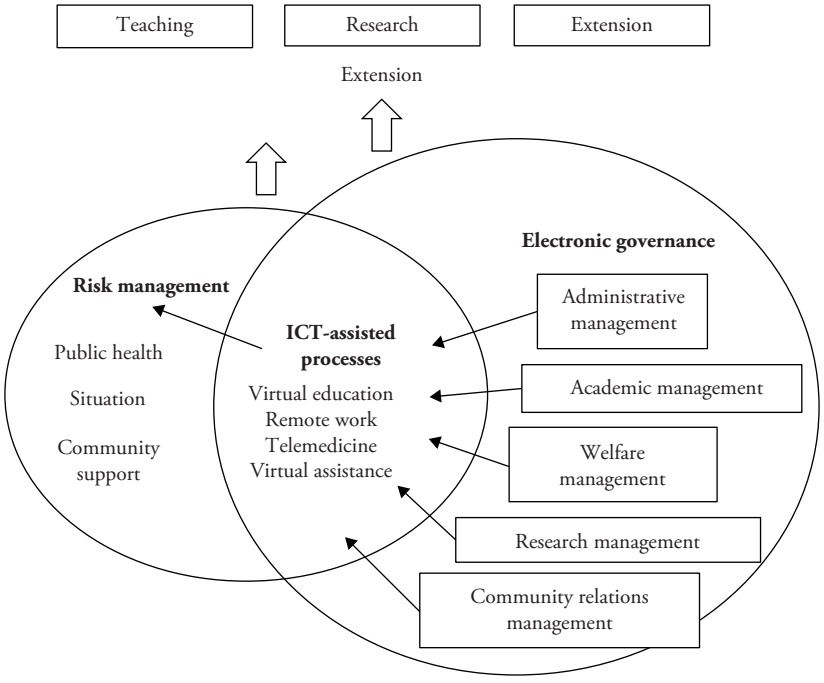
5. Discussion of results

As with other experiences of HEIs documented in the literature, Universidad del Valle had little time to plan for the crisis forecast when the pandemic

broke out (Mishra et al., 2020; Regehr & Goel, 2020; Watermeyer et al., 2021). There were only ten days from the university's declaration of "manifest urgency" and the decision to shift to virtual classes on March 12, 2020, to the MEN's enforcement of these measures on March 22 following the government's declaration of a national state of economic, social, and ecological emergency.

During this planning phase, the university's various management areas (administrative, academic, welfare, research, and community relations) identified the main challenges, which can be grouped into two broad categories: those related to biosecurity measures, and those related to the transition to virtual academic, administrative, and research activities (see Figure 1). That is, the university's management was largely oriented towards minimizing the risk of transmission of the SARS-CoV2 virus and the implementation of an e-governance strategy to enable the execution of teaching, research, and extension work amid a "new reality" characterized by social distancing and lockdown periods (Barquero-Cabrero et al., 2020; Corral et al., 2020)

Figure 1.
University management focal points for tackling the COVID-19 pandemic



Source: Compiled by authors.

The electronic governance strategy consisted of the implementation of ICT-assisted modalities, and was the product of a new combination of financial, technological, information, and knowledge resources, as well as processes and activities (Aguilera, 2006; Cejas & Alfonso, 2012), which enabled virtual education, remote and at-home work, telemedicine, virtual assistance and service, and so on. Notable among these resources, processes, and activities were the establishment of virtual communication and service channels using methods such as email, telephone lines, and videoconferencing platforms; technological resources and platforms for classes such as the university's virtual campus and Google Meet; digital bibliographic material accompanied by training processes for its management; the implementation of digital signature systems for the virtualization of processes and procedures; and technology management, pedagogical guidance for the use of virtual environments, and support for professors and students.

In this regard, according to the university administrators interviewed, the e-governance strategy of ICT-assisted modalities (Corral et al., 2020) meant improvements in the efficiency and effectiveness of management across the university's different areas, processes, and organization of work. This constituted not only a digital transformation process but also a risk management strategy, allowing the university to continue with its essential functions without the threat of virus transmission posed by on-site activities.

Although most university management during the pandemic was characterized by digital transformation, there were also activities aimed at curbing the spread of coronavirus on the university's campuses and outside them, in order to support the community. In addition to reorienting activities towards remote modalities, this involved reorganization of tasks in order to deal with the challenges of the pandemic, adaptation of the universities' physical infrastructure, partnerships with other institutions, financial support for students, and the creation of specialized programs for epidemiological surveillance of the university community.

Risk management also focused on other actors in the wider community and throughout Colombian society, who benefited from the university's knowledge contributions, medical equipment, various forms of logistics and support, and provision of facilities, laboratories and equipment to address the pandemic and its challenges. These measures illustrate that the process of reconfiguring university management in the face of the pandemic was not only aimed at meeting the university's own goals and fulfilling its essential functions but also took into consideration the needs of a society in crisis and compliance with the regulatory framework (Aguilera, 2006; Cejas & Alfonso, 2012; Meléndez et al., 2010) established

by the Colombian president's office, the Ministry of Health and Social Protection, and the MEN.

Even though Universidad del Valle succeeded in transforming its processes in order to continue operating amid the general uncertainty of the early stages of the pandemic, to do so it had to overcome challenges and implement digital processes—such as e-governance and virtual education—in very short order (Corral et al., 2020). The emerging trends have had positive effects in terms not only of university management, but also new online forms of learning, expanded knowledge transfer and coverage, and evolving user preferences. This all attests to the importance of the digital transformation of management processes, which can translate into greater efficiency and enable continuity during situations of crisis such as pandemics, natural disasters, or social issues that affect the operations of and in-person attendance at HES campuses.

6. Conclusions

This article described and analyzed the management strategies and practices carried out by Universidad del Valle during the COVID-19 pandemic in Colombia in 2020. The case study allowed us to identify the ways in which university management was configured to deal with the disruptive external variables associated with the pandemic. The coronavirus crisis has imposed different challenges on HEIs in terms of the spread of the virus and its effects on health; virtual education; the consequent social and economic crises; and the needs of institutional and wider communities.

The analysis found that management at Universidad del Valle was focused on risk management to curb COVID-19 infections, as well as on the incorporation of technological tools to establish the virtual models that allowed the university to continue fulfilling its essential functions. These dimensions were based on the identification of a series of public health, technological, financial, and structural challenges associated with assuring ICT-assisted teaching, learning, and working.

The configuration of university management during the pandemic was mediated by government provisions, the need to continue providing higher education through remote modalities, promotion of the university community's physical and mental health, and support for the community outside the university. This process has required the input of the university's various administrative areas, which have collectively developed and implemented strategies and actions that have moved beyond the planning stage but whose application and monitoring is ongoing in a context that remains both

unprecedented and uncertain. This study adds to the emerging literature on the challenges that the COVID-19 pandemic has precipitated in university management and the higher education sector in general (Bedoya-Dorado et al., 2021, Crawford et al. al., 2020; Paudel, 2021; Regehr & Goel, 2020; Sobaih et al., 2020; Tesar, 2020; Watermeyer et al., 2021), and contributes to our understanding of how HEIs have responded to this crisis to guarantee their essential functions.

As has been argued here, digital transformation processes contribute not only to improving the efficiency of university management but also to a model of educational development, while also serving as risk management strategies to prevent viral infection or other types of threats that may arise. When it comes future research, a multiple-case study is suggested in order to analyze the trends in the higher education sector as a whole and, once the pandemic ends, to examine the results of the strategies implemented by HEIs. It would also be worth analyzing the ways in which digital transformation processes have had an impact on university management and higher education quality in the countries of Latin America and the Caribbean, which still lag behind some other regions.

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