

**Thesis title: IMPACT OF THE COVID-19 PANDEMIC ON
SOUTH AFRICAN HIGHER EDUCATION SYSTEMS
PRIOR TO, DURING, AND AFTER THE PANDEMIC.**

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Thesis title Impact of the COVID-19 Pandemic on South African Higher Education Systems Prior to, During, and After the Pandemic.	Number of pages = 85
<p>Abstract</p> <p>The outbreak of the COVID-19 pandemic posed severe problems to the educational systems globally and South African higher education systems specifically. Schools, colleges, and universities in more than one hundred countries worldwide were closed for an extended period to prevent the pandemic from spreading. The closure of schools, colleges, and universities affected more than a billion students due to the lockdown. This research examines the effects of the coronavirus outbreak on South African higher education systems. The study reviews empirical evidence on the impacts of the COVID-19 pandemic lockdown on the education systems in South Africa. This study provides a systematic review of evidence-based research on the effects of the COVID-19 pandemic on the education systems in South Africa. Results indicate diverse adverse health, psychological, academic, emotional, and financial effects. Specific measures that could reduce future impacts in case of a recurrence of such a pandemic were also identified.</p> <p>Keywords COVID-19 Pandemic, Higher Education Students, Higher Educational Systems, Future Impacts</p>	

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1 Introduction

The global education sector saw exacerbated inequities due to the advent of the Coronavirus pandemic in 2019. Despite being a recent occurrence, the coronavirus pandemic has already begun adversely impacting the human population. The COVID-19 pandemic has resulted in significant disruptions to the field of education and has given rise to widespread worldwide health concerns, posing considerable challenges for global health systems in terms of management and containment. The global impact of the coronavirus pandemic has affected every nation and race, indicating that no population has been exempt from its effects. The quick transmission and severe consequences of COVID-19 have permeated the globe. The COVID-19 pandemic lacked geographical limitations, resulting in a broad and expeditious influence. In the initial months following the epidemic, a significant portion of the global population was compelled to adhere to 'stay-at-home' mandates and 'self-isolation' protocols and adopt remote work and study arrangements. The measures mentioned above curtailed individuals' ability to exercise their freedom of movement, engage in commercial activities, and form social connections.

The COVID-19 pandemic led to the widespread implementation of total lockdown measures in numerous nations globally, resulting in significant loss of life, notably among vulnerable populations such as women and older people. It was disconcerting to see that data from multiple continents, encompassing America, Africa, Asia, and Europe, suggested a daily escalation in the number of newly reported COVID-19 cases and fatalities. As of April 2020, the worldwide prevalence of COVID-19 has exceeded one million cases, resulting in more than 220,000 deaths. Furthermore, the disturbing aspect of the situation lies in the United States recorded figure of over 2,000 COVID-19 fatalities within a single day, despite its robust dedication to mitigating the epidemic. The mortality rate associated with the coronavirus exhibited an upward trajectory, while the absence of quick remedies posed a significant challenge. The disease showed no indications of ceasing its worldwide dissemination. President Trump used the Defence Production Act to react to the COVID-19 epidemic. At the same time, the government declared a state of emergency considering the escalating number of new cases of the Coronavirus (Priscilla, 2020). The United States government negotiated with the parliament to secure authorization for a stimulus package exceeding 2 trillion US dollars. The measure was taken to address the challenges posed by the Coronavirus pandemic and help individuals and enterprises impacted by the epidemic. Comparable actions were implemented in other countries, such as Germany, where a

substantial amount of 810 billion US dollars was allocated to mitigate the consequences of the pandemic. Nevertheless, the virus rapidly disseminated to other places across the world.

The worldwide dissemination of the COVID-19 virus profoundly impacts all facets of human endeavors, encompassing education, research, sports, entertainment, transportation, religious practices, social engagements, economic pursuits, and political affairs.

Undoubtedly, the global community experienced significant turmoil due to the COVID-19 pandemic. Accepting the challenging reality was difficult since the educational sector remains among the most severely impacted industries after the Coronavirus pandemic. The health, psychological, financial, and other effects of COVID-19 on the South African higher education system are examined in this thesis.

1.1 Problem statement

The global transmission of the COVID-19 virus has significantly influenced various aspects of human activities, including but not limited to education, research, sports, entertainment, transportation, religious practices, social interactions, economic actions, and political matters. The international society has undoubtedly encountered substantial upheaval due to the COVID-19 epidemic. The acknowledgement of the arduous nature of the situation was accompanied by considerable challenges, as the educational sector, particularly the South African higher education system, continues to be one of the industries most profoundly affected by the global COVID-19 pandemic.

1.2 Aim and Research Objectives

The main aim of this study is to examine the impact of the COVID-19 pandemic on the higher education systems in South Africa. The study aims to assess the level of preparedness of the South African higher educational system in response to an unforeseen pandemic, analyze its impact on the educational system, explore the psychological effects experienced by higher education students, and investigate potential preventive measures.

1.3 Research Questions

The research questions for this study are as follows:

- i. What are the effects of the COVID-19 pandemic on the South African higher education system?
- ii. To what extent has the COVID-19 pandemic impacted the South African higher education system compared to the experiences before and after the pandemic?
- iii. What are the driving forces behind the factors responsible for the impact of the COVID-19 pandemic on the South African higher education system?
- iv. What are the best practicable development control and management approaches to prevent the future occurrence of the COVID-19 pandemic impact on the South African higher education system?

1.4 Research Restriction

The accuracy of the standards, expenses, and data utilized in this study was presumed during the period in which the research was undertaken. The study does not encompass the practical execution of the proposed approach in the field. In addition, using direct data in this study is impeded by ethical considerations. The utilization of primary data regarding the academic achievement of South African students could have been feasible, but obtaining such data would have necessitated securing agreement from several students who have graduated from their respective schools, hence lacking any identifiable means of contact.

1.5 Validity and reliability of the study.

This research is valid and can be relied upon from the viewpoint of many references and citations from online and published literature (Aborode *et al.*, 2020; Chew *et al.*, 2020; Landa *et al.*, 2021). Many surveys, reviews, interviews, and research works have been conducted related to this study's focus. Many of these works are referenced in this research study.

2 Review of the COVID-19 pandemic

2.1 Conceptual Structure

This research studies the interaction between the economic, social, health, and emotional factors and the South African higher education system and students during the COVID-19 pandemic, as illustrated in Figure 1. It focuses on the impacts of the factors experienced by the system and students because of the sudden and unexpected pandemic, which was unprepared for. It is a significant force in redesigning an optimal pathway against future occurrence.

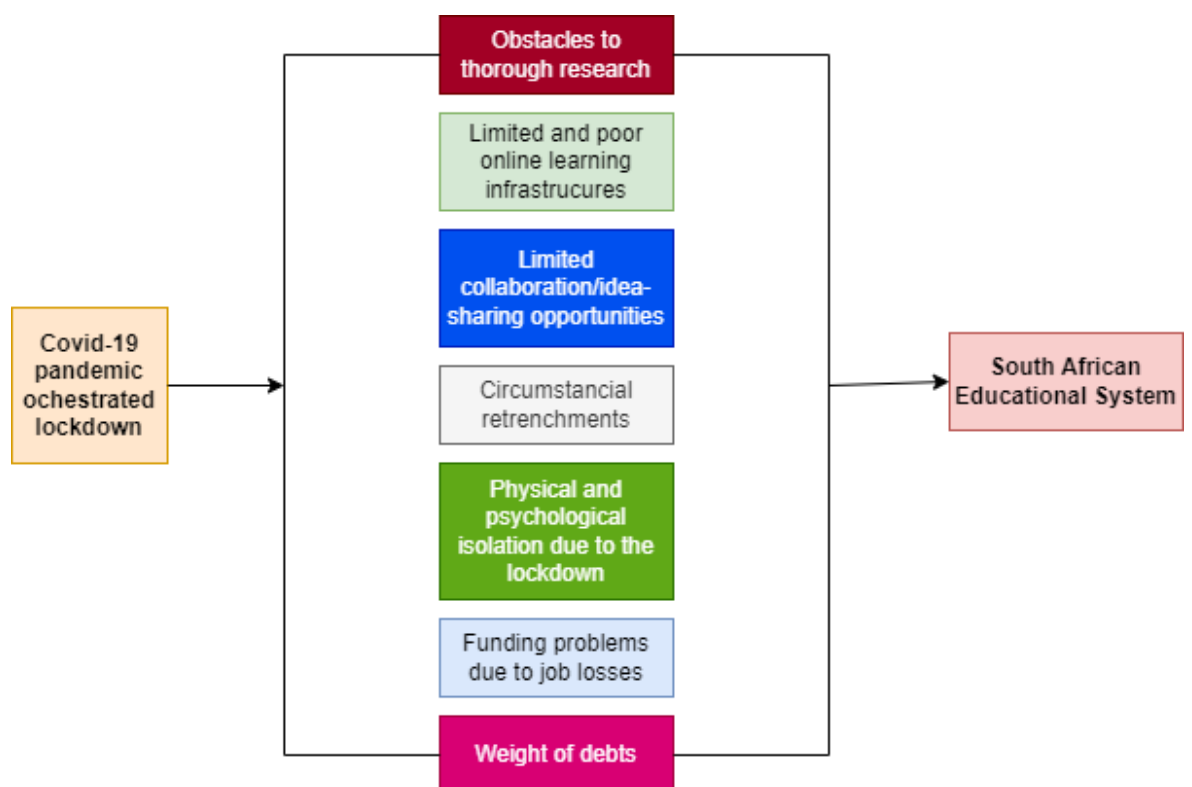


Figure 1: The conceptual structure of this study

Limited research has been conducted on the impact of the COVID-19 pandemic on the educational systems in South Africa, as evidenced by a small number of papers (David, 2021; Patrick et al., 2021; Gustafsson and Nuga, 2020). The impact of the COVID-19 epidemic on the educational system in South Africa aligns with its implications on the physical, psychological, economic, emotional, and mental well-being of pupils in the country. To comprehensively address the impact of the COVID-19 epidemic on educational systems in South Africa, it is imperative to mitigate the resultant stress and

pressure effectively. Figure 1 depicts the diverse detrimental impacts that the COVID-19 epidemic has exerted on educational systems in South Africa.

Furthermore, it is imperative to be well-equipped for probable future events. A sustainable mitigation strategy represents a viable approach for addressing various challenges stemming from the COVID-19 pandemic. These challenges encompass impediments to both learning and research, inadequate online learning infrastructure, restricted collaboration among students and researchers due to lockdown measures, involuntary layoffs resulting from business closures, isolation both physically and psychologically, financial difficulties faced by students due to job losses, and the burden of debt arising from the economic downturn. The successful implementation of a sustainable mitigation strategy is closely tied to socioeconomic and political advancement and stability within a given region. These features are consequently crucial to regional and national planning. The most optimal elucidation for the sustainable mitigation model illustrated in Figure 2 (source: Onaolapo et al. 2022) pertains to integrating COVID-19 encounters into South Africa's educational framework. The approach elucidates the interconnections among the fundamental elements of the educational system, specifically the student population, function, and form.



Figure 2. The model proposed for long-term COVID-19 pandemic mitigation (source: Onaolapo et al. 2022)

The student population plays a fundamental part in formulating mitigation measures, while the strategy's function elucidates the commercial responsibilities and effects on service provision. The function might also possess economic characteristics, which are facilitated by infrastructure. The shape of the method pertains to its applicability within the academic setting, taking into account the students' psychological, emotional, and health factors. The diagram labeled as the "bowl model" in Figure 2 depicts the integration of the current study within a broader understanding of the various factors that need to be considered to ensure the long-term viability of COVID-19 pandemic mitigation strategies.

2.2 Introduction to the COVID-19 Epidemic

The year 2019 witnessed the initial emergence of the Coronavirus Disease in Wuhan, China. The World Health Organization subsequently assigned the term "COVID-19" as an official designation, representing the acronym for Coronavirus Disease 2019. The ongoing Coronavirus epidemic is regarded as one of the most severe global pandemics in recent decades. The increasing mortality rate and the high level of transmissibility were causes for concern. According to studies conducted by the World Health Organization (WHO, 2020), the likelihood of experiencing severe illness because of the Coronavirus is higher among older adults and those with pre-existing medical disorders such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer. The symptoms associated with the Coronavirus encompass a sore throat, nasal congestion, persistent coughing and sneezing, respiratory distress, and exhaustion.

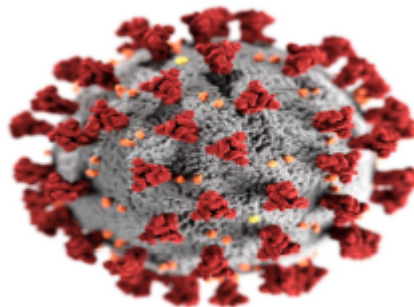


Figure 3: Morphology of Coronaviruses as depicted in Figure 3 (Wikipedia, 2020a -SARS-CoV-2-without background.png).

During the period under review, there was a lack of efficacious treatments for the Coronavirus. However, it is noteworthy that concerted international endeavors were being made to formulate a therapeutic vaccine to combat this ailment. Nevertheless, recent instances serve as evidence that modifying one's conduct can contribute to the containment of the Coronavirus. Several recommended strategies to mitigate the spread of the coronavirus pandemic encompass enhanced individual behaviors, such as practicing proper

personal hygiene, which entails regular handwashing with alcohol-based sanitizers. Additionally, adopting conscientious respiratory etiquette, characterized by covering one's mouth and nose while coughing or sneezing, is advised. In addition, personal protective measures, such as using face masks, maintaining social distance, refraining from touching one's face, and minimizing contact with others through self-isolation at home or abstaining from nonessential travel and gatherings, are also advocated. The coronavirus pandemic is a worldwide concern that demands heightened efforts in collaborative action and international cooperation to effectively mitigate the spread of the virus and address its subsequent consequences. Consequently, the United Nations has formally appealed for \$2 billion to provide financial support for worldwide initiatives addressing the ongoing COVID-19 pandemic. Failure to strictly comply with public health standards and guidelines may result in heightened severity of the repercussions associated with the COVID-19 pandemic (see Impact of Coronavirus Pandemic on Education).

2.3 Worldwide Responses to the COVID-19 Epidemic

The effective management of any disease outbreak necessitates a proactive and timely reaction. However, the emergence of the Coronavirus caught the global community off guard, leading to a lack of preparedness among numerous nations, including those considered to be global leaders. Following the first emergence of the COVID-19 pandemic, the World Health Organization (W.H.O.) promptly disseminated guidelines and updates about mitigating its transmission. Subsequently, numerous countries implemented steps with the W.H.O. guidelines to curtail disease dissemination. Individuals were instructed to engage in remote work, and widespread lockdown measures were implemented across a significant portion of the world. Certain nations have employed their military forces to enforce measures to mitigate the spread of the Coronavirus and minimise non-compliant individuals, colloquially referred to as "covidots." There was a surge in demand for protective gowns, hand sanitizers, facial masks, and hand gloves in nations such as the United States and the United Kingdom.

Furthermore, individuals actively engaged in providing medical care, including physicians and nurses, were granted permission to visit if they were either currently employed or willing to provide treatment for COVID-19 patients. In addition, huge gatherings and sporting events were significantly cancelled at local and international levels. Before its suspension, prominent sporting events like the prestigious European Champions League were conducted without spectators. The global responses to the Coronavirus pandemic

exhibited considerable variation across different countries, albeit with a prevailing consensus among most nations in favor of implementing school closures as a preventive measure against the transmission of COVID-19. Due to the COVID-19 outbreak, numerous educational institutions in the United States were compelled to suspend operations, leading to the closure of schools and the subsequent cancellation of exams and assessments.

According to Madeline's (2020) assessment, certain educational institutions in the United States that were forced to shut down because of the Coronavirus pandemic may remain closed for the current academic year. The states of New York and California saw significant negative impacts during the pandemic in the United States, with a steady rise in the number of cases seen despite the implementation of robust measures by both federal and state authorities to mitigate the spread of the virus. At a particular juncture, the United States surpassed China regarding the number of Coronavirus cases, although the nation remains resolute in its commitment to overcome the pandemic. School closures significantly impacted more than sixty million students in the United States. In Spain, around 11 million students experienced the impact of school closures as a measure to prevent the transmission of the Coronavirus. Due to the escalation in the number of confirmed cases of the Coronavirus across the nation, educational institutions at the regional level have implemented closures. The closing of educational institutions in Spain, particularly Madrid, led to the discontinuing of employment agreements for individuals employed in school cafeterias and special education (El Pais, 2020). The shutdown of schools was deemed imperative, considering Spain's daily loss of 849 individuals due to the Coronavirus. The shutdown of all schools and colleges in Saudi Arabia was mandated by the Ministry of Education in response to the Coronavirus outbreak, as reported by Middle East Monitor (2020). The government has required virtual schools and distance education to maintain the ongoing effectiveness and high quality of the educational process.

According to Michael's (2020) findings, many independent schools in New South Wales, Australia, were compelled to cease their operations, resulting in a shift of some pupils towards online educational platforms. Students engage in remote learning, while several academic institutions have implemented stringent protocols to enforce a social distancing approach. The Australian government endorsed the reopening of schools during the coronavirus outbreak. The Prime Minister made a public declaration regarding the decision

to keep schools operational, citing the government's perspective that children are exposed to a minimal risk of contracting the Coronavirus. Additionally, the Prime Minister emphasized the potential adverse consequences on the health sector and economy that could arise from the closure of schools. The government provided a persuasive health rationale to support the decision to maintain the operation of schools.

Nevertheless, educators and parents voiced apprehension (A.B.C. News, 2020). Also, restrictions on outdoor meetings involving more than two individuals were implemented, and a substantial sum of 18 billion dollars was allocated to address and mitigate the transmission and consequences of the Coronavirus. In Italy, educational institutions were temporarily shut down without a specified reopening date, and the armed forces were mobilized to aid in implementing regulatory measures. Despite the diligent efforts undertaken by the government to mitigate the transmission of the Coronavirus, the nation emerged as the primary locus of the epidemic, witnessing a staggering 969 fatalities directly attributed to the virus within a single day.

To mitigate the transmission of the Coronavirus, the Indian government implemented the closure of schools and educational establishments, with the enforcement of the "Janata" Curfew, mandating individuals to observe a period of confinement within their residences. In addition, the authorities conducted visits to specific urban areas to promote public consciousness of the ongoing pandemic. In a televised speech, President Emmanuel Macron of France issued a directive to close all institutions. The decision was implemented as a response to the escalating public health emergency resulting from the outbreak of the Coronavirus within the nation. Like numerous other locations worldwide, the country experienced significant repercussions. Based on available evidence, it has been determined that the Coronavirus originated in Wuhan, China, and the city played an essential role as the outbreak's epicentre. Educational institutions and other public establishments were temporarily shut down to mitigate the transmission of the virus.

The efficacy of the government's decision to close schools and implement various measures resulted in a substantial containment of the pandemic. The nation implemented border restrictions with certain neighboring countries as well. In response to the need to contain the coronavirus outbreak, the Iranian government implemented a comprehensive action involving the closure of all institutions. Nevertheless, the nation was situated at the focal point of the coronavirus epidemic, and the number of deaths was substantial. The

economic challenges faced by Iran were further compounded by the COVID-19 pandemic, exacerbating an existing strain resulting from the imposition of economic sanctions by Western nations. Educational institutions in Senegal were temporarily shut down to mitigate the transmission of COVID-19. Subsequently, this nation became the inaugural sub-Saharan African country to implement the closure of educational institutions in response to the outbreak of the Coronavirus. Due to the outbreak of the coronavirus pandemic, the South African government issued a directive mandating the closure of all institutions.

Furthermore, it should be noted that there is a prohibition regarding meetings involving more than 100 participants. The country witnessed an increase in newly reported cases, prompting the implementation of behavioral change initiatives to mitigate disease transmission. Due to the swift and widespread contamination of the Coronavirus within Germany, educational institutions were compelled to suspend their operations. According to reports, the fatality rate attributed to the Coronavirus was comparatively lower than that observed in neighboring regions. Furthermore, the nation has committed more than 800 billion dollars to address the pandemic. In the context of the epidemic, educational institutions in Russia were temporarily shut down, and additional preventive measures were implemented. According to reports, the fatality rate attributed to the Coronavirus in Russia was relatively low. However, various precautions were implemented to mitigate the spread of the pandemic.

The federal government of Nigeria mandated the closure of all educational institutions. The National University Commission (NUC), which serves as the governing body for all universities in Nigeria, has issued a directive to all universities nationwide to cease operations as a subsequent action to the decision. Furthermore, the government prohibited social gatherings and mandated that employees engage in remote work. According to official government sources, the initially documented incidence of Coronavirus in Nigeria was effectively managed, and the patient was subsequently discharged. However, subsequent instances of the virus have been identified. Hence, the country must enhance its disaster preparedness and response capabilities. Educational institutions in Ghana were temporarily shut down to mitigate the transmission of the coronavirus sickness.

Furthermore, the government granted a substantial sum of \$100 million to assist in combating the ongoing pandemic. The nation implemented pre-emptive measures to

mitigate the transmission of the virus. To date, Madagascar has reported no fatalities attributed to COVID-19 and asserts to have achieved a significant advancement in the therapy of COVID-19 using herbal medicine.

Nevertheless, the World Health Organization (WHO) has issued a cautionary statement emphasizing the lack of scientific evidence supporting the assertion and advising against the endorsement of this purported remedy for COVID-19. Notably, specific countries, including Singapore, Sweden, Brazil, and Australia, choose to keep their schools operational to implement containment measures, in contrast to the approach taken by numerous other nations that decided to close educational institutions. The abrupt cessation of educational institutions proved successful in mitigating disease transmission. However, this course of action had detrimental implications for the academic pursuits of many students globally, as they encountered numerous challenges.

2.4 Responses of the South African Government to the COVID-19 Epidemic

The confirmation of an index cluster of imported cases in South Africa occurred on March 5, 2020. The country promptly responded by enacting a state-wide quarantine and implementing a thorough public health intervention. Following the Calamity Management Act's provisions, the President proclaimed a calamity state. The government has devised a risk-based approach that associates five tiers with the degree of transmission, wherein level five denotes the most severe scenario characterized by extensive community transmission and the implementation of a nationwide lockdown. The World Health Organization (WHO) has committed to dispatching technical experts to assist South Africa's efforts in responding to the COVID-19 pandemic. This commitment is rooted in the organization's extensive disaster preparedness program and its established experience in South Africa.

In March 2020, the technical staff stationed at the country office were redeployed to assist in the national-level COVID-19 response in four specific provinces. In July 2020, when the nation held the fifth position globally in total reported cases, the President formally requested technical support from the Centers for Disease Control and Prevention (C.D.C.). On August 5, 2020, supplementary personnel was deployed to the nation. The surge team had experts in many fields, including coordination, epidemiology and surveillance, case management, infection control, operations and logistics, and risk communication. Team members have been appointed nationally and in eight provinces: Gauteng, Free State, Northwest, KwaZulu-Natal, Mpumalanga, Eastern Cape, Northern Cape, and Limpopo.

The WHO's priorities and support during the COVID-19 response in South Africa are as follows:

i. National strategic assistance

- Global practices and evidence synthesis to guide COVID-19 response
- Technical support for the National Department of Health's Director General's office
- Strategic support to the Ministerial Advisory Committee's Technical Working Groups
- Technical evaluations of national plans and strategies

ii. Response management

- Intra-Action Evaluation
- System for Incident Management Improvements
- Supervisory Assistance for the Districts
- Prepared and revised national emergency plans
- Development of a National Containment Strategy
- Provincial and district resurgence plan creation, implementation, and monitoring

iii. Surveillance epidemiology, rapid response, and contact tracing

- Enhanced case investigation through on-the-job training and development
- Improved data quality, harmonization, and management overall
- Intensive technical assistance with epidemiological evaluation
- Recruitment and transfer of five district epidemiologists in Free State.

iv. Infection control and prevention

- Evaluation and suggestions for the I.P.C. program
- Printing and distribution of facility/national I.P.C. guidelines
- Intensive I.P.C. instruction and training
- With HAI surveillance plans, policies, and procedures in place

- Perspectives on Multimodal enhancement strategies for I.P.C. actions
- Enhancing I.P.C. monitoring, evaluation, and feedback systems
- I.P.C. practices were surveyed and evaluated for enhancement
- Guidance on immediate I.P.C. policy, resource, apparatus, and training requirements

v. Vaccination dissemination and planning

- Enhanced evaluation of country preparedness for COVID-19 vaccine introduction
- Support for the formulation of vaccine introduction plans and field guides
- Development of the Vaccine Safety Committee's Capabilities
- Vaccine specialists have been deployed to support coordination and operational planning
- Supervision and training on the job regarding immunization practices and safety monitoring.

vi. Risk communication and community participation

- Contributed to the strategic direction and evidence-based interventions of the RCCE.
- Introduced techniques for improved risk communication
- Development of a communication strategy and instruments for social behavior change
- RCCE Integration into the National Response Plan

vii. Administrative administration

- Comprehensive Intra-Action Review and Case Management Analysis
- Transfer of expertise on the clinical COVID-19 pathway
- Analysis of gaps and requirements for 62 health facilities using WHO IPC assessment instruments
- Over 200 facility evaluations in the triage system and I.P.C. mentoring

- National and provincial coordination and rigor in technical support for case management

viii. Data processing

- Audits and harmonization of data integrity in seven provinces
- Districts in five provinces will receive data collection instruments, auditing, and quality control training.
- Developed data management S.O.P.s and launched a series of trainings to enhance processes.
- Utilized data assistants to improve data management
- Technical and financial support for the implementation of Go.Data in five districts where it has enhanced case investigation and contact tracking.

The COVID-19 pandemic has given rise to an unparalleled worldwide crisis encompassing various dimensions, including humanitarian, socioeconomic, and human rights. This situation has further intensified existing vulnerabilities and significantly strained healthcare institutions. As of October 2021, most of the COVID-19 cases recorded by the World Health Organization (WHO) in Africa were concentrated in South Africa, rendering it among the Nations most significantly impacted. Despite a decrease in the number of COVID-19 cases in South Africa, there continues to be a persistent need for various measures to address the ongoing challenges posed by the pandemic. We urge all individuals, organizations, and collaborators to sustain their assistance for the COVID-19 response, placing particular emphasis on enhancing immunization endeavors and upholding the provision of crucial healthcare services and infrastructure. The issues about the reaction to the coronavirus epidemic can be effectively tackled by joint efforts and commitments, aiding the nation in devising a viable strategy to navigate its way out of the pandemic.

2.5 Effects of COVID-19 on the South African Higher Education System

The global outbreak of the Coronavirus has had a detrimental impact on educational endeavors across the globe. The coronavirus epidemic significantly affected the international educational systems, leading to widespread closures of schools (Wikipedia, 2020b). The above event resulted in substantial disturbances to scholarly endeavors and

professional aspirations. In response to the ongoing coronavirus pandemic and as a component of worldwide efforts to battle COVID-19, numerous nations have implemented the closure of educational institutions to mitigate the spread of the virus. Based on the findings of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) monitoring, it has been observed that over 100 countries have enforced comprehensive school closures, resulting in a significant impact on more than 50% of the global student population (UNESCO, 2020a). In the context of the United Kingdom, Prime Minister Boris Johnson, who was initially opposed to the measure, eventually acknowledged that the closure of schools could exacerbate the declining trajectory of the Coronavirus outbreak (A.B.C. News, 2020). Several countries, including Nigeria, Ghana, Senegal, South Africa, China, Kazakhstan, Ethiopia, Honduras, India, Japan, Iran, the United States, France, Spain, Italy, North and South Korea, Lebanon, Vietnam, Thailand, Germany, and South Korea, among others, have implemented school closures in response to the COVID-19 pandemic.

The closure of educational institutions incurs significant social, educational, and economic burdens, resulting in widespread disruptions that affect individuals within communities. However, it is essential to note that these adverse effects are particularly pronounced among individuals and families that are already disadvantaged (UNESCO, 2020b). Suppose a timely discovery of a more dependable remedy for the Coronavirus is not achieved, and the propagation of the sickness persists. In that case, it is plausible that the resultant perturbation in the educational domain stemming from COVID-19 may endure for a duration exceeding initial projections. According to a statement attributed to Andrey Azoulay, the director-general of UNESCO, as reported by VOA News in 2020, the impact of the COVID-19 pandemic on education is unparalleled in terms of its worldwide magnitude and rapidity. If this situation persists, it can potentially jeopardize the fundamental right to education. Undoubtedly, unforeseen school closures can provide considerable obstacles for kids, educators, caregivers, and the broader community. The potential consequences of this phenomenon may manifest as a decline in pupils' academic engagement and achievement.

The lack of productive engagement among students may contribute to increased involvement in criminal activities among youth, diminished motivation in the pursuit of knowledge, and subpar academic achievement. The potential consequences of school closures have also been a worry for the U.S. Center for Disease Control and Prevention

(C.D.C.). Based on the findings of the Centers for Disease Control and Prevention (C.D.C.), it is posited that prolonged closures of educational institutions could potentially lead to an increased tendency among students to gather close outside of their respective schools. Quentin (2014) asserts that the issue of school closures is a subject of significant controversy and can potentially impact a considerable population of kids enrolled in receiving educational establishments. Physical assistance from instructors is sometimes crucial for students with special needs or learning issues, and its absence can detrimentally affect the quality of teaching, learning and academic progress. While technology has the potential to alleviate inevitable adverse consequences associated with school closures, it is incapable of entirely substituting the essential impact of in-person interactions between children and teachers.

Furthermore, many pupils face limited availability of supplementary technology, impeding their ability to fully harness the educational benefits of learning technologies amidst school closures. However, in contrast to initial predictions, research utilizing mathematical models and empirical investigations of reactive school closures implemented during previous pandemics have demonstrated a reduction of approximately 25 percent in the overall number of cases within the community. Additionally, these closures have been found to effectively delay the pandemic's peak by one to two weeks. On the other hand, proactive school closures implemented during pandemics continue to be recognized as one of the most efficacious interventions for mitigating the impact of epidemic diseases (Erika and Nicholas, 2020).

2.5.1 Effects of the COVID-19 Pandemic on South African Higher Education School Closures

The term "school closure" pertains to the cessation of educational activities at schools because of many circumstances, such as a pandemic outbreak, an emergency, a labor strike, a natural disaster, or intentional initiatives aimed at relocating a school or mitigating crime within a specific campus or area. This implies that the closure of schools is not solely limited to emergencies or pandemics but can also be employed to address identified deficiencies within a specific educational institution. In Nigeria, for instance, the government or school administration routinely closes schools to handle security concerns such as cultism, terrorism, or violent protests on campus. According to Ben, Mathew, and Kristen (2010), Gewertz (2009) asserts that 5,000 underperforming schools in the United

States were shut down during the Obama administration as a component of a comprehensive set of approaches to revitalise these institutions. While it may be justifiable to implement school closures in certain circumstances, the current global school closures resulting from the Coronavirus outbreak have adversely affected several educational systems worldwide. As of March 23, 2020, the international number of children affected by school closures due to the COVID-19 pandemic exceeded 1.3 billion (Wikipedia, 2020b). According to Erika and Nicholas (2020), the closure of schools can be categorized into two types: reactive and proactive. According to Erika and Nicholas, the closure of schools in response to the finding of coronavirus cases among students, staff, or parents is considered a reactive measure. In contrast, proactive school closure occurs before the sickness reaches the school's entrances.

According to Madeline (2020), the closure of schools in response to the coronavirus pandemic has presented novel difficulties, including the need to navigate the shift towards online and remote learning, as well as the necessity to address the needs of those who rely on schools for sustenance and stable housing. Onaolapo et al. (2022) and Onaolapo et al. (2020) found that school closures due to Coronavirus tend to increase demands on students, teachers, and parents, particularly those with inadequate education, resources for ongoing education and digital abilities. The situation places an additional responsibility on parents, who must manage their households' financial needs and oversee their children's educational progress inside the home. The unprecedented closure of schools imposes a heightened strain on hospitals, as they are compelled to address a more significant number of health-related cases that school health facilities would often handle. The closure of educational institutions due to the coronavirus pandemic can exacerbate student debt, prolong the duration of academic programs, undermine students' educational goals, and disrupt the scheduling of educational institutions' programs. Prolonged school closures may exacerbate the attrition rate, as students may experience waning motivation and encounter resource limitations that hinder their ability to persist in their education. Extended periods of school closures can lead to inactivity among students, fostering detrimental peer pressures and increasing the likelihood of adolescent engagement in criminal behavior, provided that appropriate measures are not implemented to address this issue adequately. During unanticipated school closures, a considerable proportion of individuals employed within the education sector face the potential consequences of reduced wages or, in more severe cases, termination of their employment. According to

UNESCO (2020b), the adverse impacts of school closures resulting from the coronavirus pandemic encompass the subsequent aspects:

1. Students are deprived of opportunities for growth and development when schools are closed because they provide essential learning.
2. Nutrition: Many children rely on free or discounted school meals for nourishment and sustenance. Coronavirus-related school closures compromise this.
3. Unequal Access to digital learning portals: lack of access to technology or adequate internet connectivity for continued learning during school closures.
4. Localized school closures burden schools, as parents redirect their children to open schools.
5. Social isolation is a significant concern when educational institutions, which serve as hubs for social engagement and interpersonal contacts, are closed. This closure can deprive adolescents and children of crucial opportunities to engage in social communication and interactions vital for their learning, growth, and innovative thinking. The closure of educational institutions and implementation of lockdown measures provide significant obstacles to researchers, particularly in cases where direct engagement with students and instructors is necessary or access to school facilities and research laboratories is restricted. The closure of schools has a significant impact on the progress of innovations and research conducted within educational institutions. According to Erika and Nicholas (2020), alternative measures exist for minimizing the effects of the coronavirus pandemic, suggesting that school closures should not be the exclusive solution. They recommended that authorities grant parents a certain degree of flexibility in selecting what is most suitable for their families, alongside implementing more comprehensive mitigation measures. In contrast to the viewpoints of Erika and Nicholas, it is worth noting that the President of the New South Wales Teachers Federation expressed opposition to reopening schools during the ongoing coronavirus pandemic. Michael (2020) asserts that schools' architectural design and classroom dimensions render implementing social distancing measures unfeasible. To reduce the consequences of school closures, educators and students were compelled to depend on technological tools and platforms to ensure the continuity of instruction. Therefore, it is imperative to recognize within the current investigation that despite the perceived challenges presented by the closure of schools due

to the Coronavirus, this measure continues to be one of the most efficacious strategies for mitigating the transmission of the pandemic.

2.5.2 Effects of the COVID-19 Pandemic on South African Higher Education Students' Health

Considering the worldwide COVID-19 pandemic, higher education institutions are experiencing an unparalleled period of transformation. Universities and academic institutions have been pushed to embrace online education and instructional methods. Many individuals were ill-equipped to handle the sudden transition to emergency remote teaching and learning (doi:10.1007/s42438-020-00187-4). Numerous institutions of higher education have embraced hybrid methodologies in the realm of pedagogy. The researchers successfully amalgamated traditional in-person teaching methods with online learning, resulting in a cohesive and integrated educational experience. The prevailing situation endured considerably, notably in regions commonly called the Global South. Despite the global availability of a diverse range of vaccines, the process of distribution and actual administration of vaccinations has been characterized by a lack of speed and efficiency in economically disadvantaged nations, particularly within the African continent (Nature, 2020).

The aforementioned has substantial implications for higher education. The university campus is more than a mere academic environment for numerous pupils. Additionally, it offers a platform for interpersonal connections that fosters the development of crucial networks and partnerships that transcend the duration of students' academic tenure (<https://doi.org/10.1515/humaff-2019-0020>).

Examining their coping mechanisms and triumphs is warranted to get insight into students' strategies for navigating and surmounting challenges. According to the study conducted by Emmanuel et al. (2021), This study shows a comprehensive evaluation of literature investigating the impact of instructional methods and learning outcomes. According to a study conducted at a research-intensive institution in South Africa (<https://doi.org/10.29034/ijmra.v12n1editorial3>), students encountered difficulties effectively managing remote online learning. Preliminary investigation has confirmed the necessity of giving precedence to the well-being of university students. The impact of the pandemic revealed that those enrolled in undergraduate programs, those who were engaged

in full-time academic pursuits, and female students exhibited heightened vulnerability within the context of remote learning conducted from their homes.

The prevalence of gender-based violence in South Africa has resulted in a problem whereby young women students are being exposed to challenging circumstances due to the implementation of stay-at-home learning (source: <https://ewn.co.za/2019/11/18/ramaphosa-our-gender-based-violence-plans-are-well-advanced>). The global pandemic has heightened uncertainty on future aspects, such as higher education and the labor market. The presence of ambiguity was found to have a significant impact on mental health within the context of the research. Universities in South Africa must support and assist students during this moment characterized by a lack of clarity and stability. Students experience several challenges arising from a deficiency in social cohesion, which encompasses an absence of interpersonal connections among their peers within the university environment.

During six weeks, 1,932 university higher education students participated in an online survey as part of the inquiry. Participation encompassed individuals from many academic levels, including undergraduate and graduate students and those from international backgrounds. The questionnaires yielded demographic data. Furthermore, the researchers investigated the students' perspectives regarding their preparedness and level of motivation concerning online instruction, learning, and evaluation. Additionally, they explored the students' level of involvement and attitude towards the COVID-19 pandemic and its influence on higher education. In addition, the survey also incorporated open-ended questions. The kids were encouraged to contemplate the extent of the disturbance brought about by the pandemic. The analysis of the data yielded seven noteworthy themes. During the COVID-19 pandemic, various challenges impeded students' capacity to engage in online learning efficiently. The themes encompassed:

- Internet accessibility
- Mental well-being
- Personal obstacles/capabilities
- Effective time management
- Being readily prepared
- Family members impede academic performance
- The interplay between professors and students

A notable finding emerged indicating that undergraduate and full-time students had a higher likelihood, nearly two and four times, respectively, of reporting mental health issues compared to postgraduate and part-time students. Individuals within the age range of 18 to 24 years were shown to have a higher likelihood, roughly 1.75 times, of experiencing mental health concerns compared to individuals over the age of 24. The outcomes of the study also reveal a gender aspect of mental health. Female learners exhibited a 1.83-fold higher likelihood of reporting mental health concerns compared to their male counterparts. The problems above encompassed anxiety, tension, and despair.

The students indicated challenges in managing time, distractions, and issues linked to their familial responsibilities. These principles were derived from the concepts of self-directed learning and self-management. These notions require discipline, personal commitment, motivation, and other factors. According to academics, the attainment of success necessitates engagement in self-directed learning. The lack of real support from peers and professors posed challenges for the students. The individuals exhibited a lack of ability to sustain motivation and concentration independently within remote learning (doi:10.3389/fpsyg.2018.02324).

The subject of internet connectivity has become significant. This observation highlights the digital disparity between urban and rural areas in South Africa. The likelihood of experiencing connectivity issues was higher among older pupils than their younger peers. This finding provides evidence in favor of the assertion that younger university students have a higher likelihood of possessing digital native characteristics compared to their senior counterparts. The pandemic led to many international students returning to their home countries in Africa. These students encountered the most significant challenges in terms of connectivity, as evidenced by several academic sources (<https://doi.org/10.1080/03098265.2019.1694876>) (<https://doi.org/10.1016/j.compedu.2010.09.004>). Data bundles were sent to students in the local area to facilitate their access to streamed lectures.

In general, the findings of this study indicate a shortage of internet access in rural regions, particularly in the most economically disadvantaged provinces of South Africa. A notable association was observed between the poverty classification of provinces in South Africa and the degree to which students reported encountering challenges with internet connectivity.

2.5.3 Long-term approach

A nation such as South Africa must not overlook the ramifications of the pandemic on higher education, specifically regarding students' physical and mental health. The Republic of South Africa possesses a notable comparative and competitive advantage rooted in its youthful population, with a particular emphasis on its university students. As per the National Development Plan 2030, available at the official government website (http://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf), the mentioned group forms a significant proportion that is essential for enhancing the state's capacity to engage in developmental and transformative endeavors actively.

In response to the epidemic, South African universities, with the Department of Higher Education and Training and various national government departments, were mandated to formulate and allocate resources towards a comprehensive, enduring plan to promote university students' welfare. One example of a program that focuses on well-being is the Well-being at Oxford program, implemented at Oxford University in England (<https://www.ox.ac.uk/wellbeingato>). The integration and long-term implementation of online mental health services, such as those provided by Canadian institutions (source: <https://www.universityaffairs.ca/features/feature-article/how-mental-health-services-for-students-pivoted-during-covid-19/>), can be considered as a crucial intervention for South African universities in the following years.

2.5.4 Financial Effects of the COVID-19 Pandemic on South African Higher Education Students

A. Impact of COVID-19 on the South African Financial Market

Since the identification of a novel strain of Coronavirus (SARS-CoV-2) in December 2019, a substantial number of individuals worldwide have contracted the virus. Several countries have officially proclaimed a state of national catastrophe and have implemented various measures, including lockdowns and quarantines, to mitigate the rapid transmission of the COVID-19 virus. The decisions above have resulted in adverse impacts on the global economy. The international and South African economies have experienced a significant slowdown due to the drop in global equity markets, interruptions in the supply chain, and heightened consumer concern. In April 2020, the International Monetary Fund (I.M.F.) forecast a 3% decline in global gross domestic product (G.D.P.), which starkly

contrasts the previously anticipated 3.3% growth before the onset of the epidemic. This projection indicates that the current economic downturn is the most severe since the Great Depression of 1929.

South Africa has faced a series of challenges in the past twenty years, encompassing events such as the Asian Crisis in 1998, the collapse of the 'dotcom' bubble and subsequent currency crisis in 2001, the Global Financial Crisis in 2008, the European Monetary Crisis, the Nenegate incident in 2016, and now, the COVID-19 epidemic. Multiple G.D.P. predictions for 2020 suggest that the South African economy is expected to see a contraction ranging from 5% to 23.5%. Specific industries will experience more significant impacts compared to others. Due to the imposition of closure limitations, the tourism, hospitality, and entertainment sectors have faced significant impediments in their operational capacities. The impact of COVID-19 on developing and emergent markets' financial markets was analyzed, along with the reactions of the equity market, bond yields, foreign exchange, commodities, and credit spreads.

A.1 The volatility of the overall market and the equity market

The volatility of the key asset classes, including interest rates, equities, foreign exchange, and trade credit, is a crucial risk indicator that holds great importance for both market participants and watchers. Since late February, there has been a notable increase in volatility within the financial markets, reaching levels that are among the highest recorded in the past century. In comparison to prior health-related crises, it was noted that the 2003 Severe Acute Respiratory Syndrome (SARS) pandemic and the 2015 Ebola epidemic resulted in moderate and brief increases in volatility. Conversely, the 1997 Avian Influenza (H5N1) and 2009 Swine Influenza (H1N1) epidemics had minimal impact on volatility. The graph below illustrates the volatility in the U.S. stock market over 92.5 years, starting from 1928. This volatility is measured by the daily variance of the S&P 500 index. COVID-19 stands up as a prominent crisis surpassing the magnitude of the Global Financial Crisis (G.F.C.). The most significant recorded daily deviation over the specified period is attributed to the events of Black Monday in 1987 and the Great Depression, as stated in the source provided (<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>).

Several of developed nations' most prominent and traditionally reliable equity indices have experienced unusual volatility. When comparing March 2020 to the remaining months

within a one-year trading cycle, the graph below illustrates that March has a higher level of volatility. The market has exhibited a certain level of volatility after the first decrease in prices

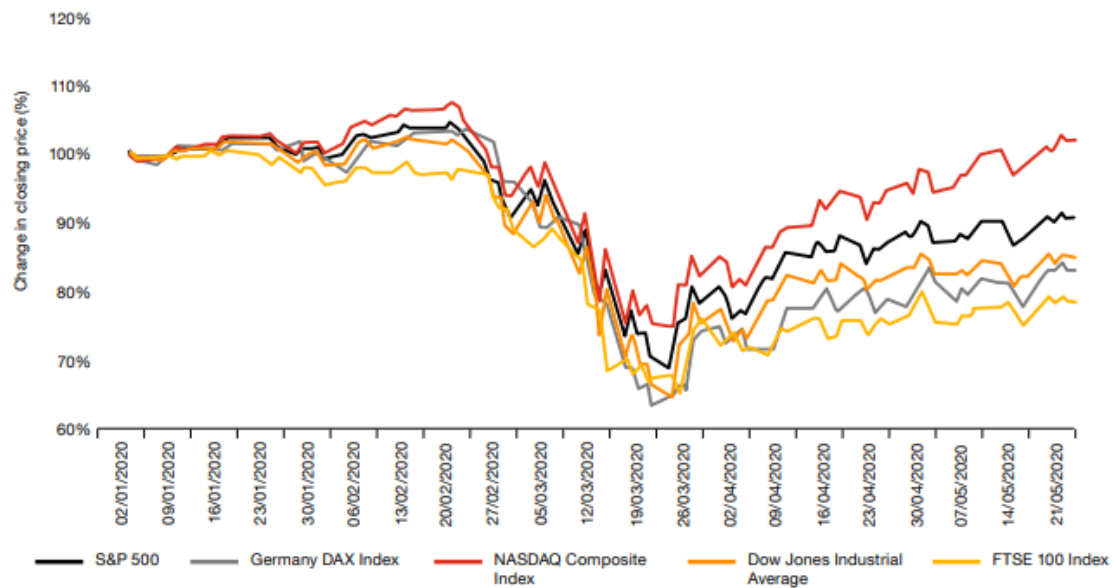


Figure 4. Equity price

[<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

The collapse of the S&P 500 commenced in mid-February 2020, and two instances of its most substantial daily sell-off since Black Monday in 1987 occurred, both transpiring in March 2020. Furthermore, it is worth noting that on March 13, 2020, the S&P 500 had a significant increase, marking its most substantial growth since October 2008, coinciding with the declaration of a national emergency by the President of the United States. The occurrence of these nonstandard fluctuations in the market serves to underscore the inherent unpredictability of the market, as traders include multiple potential outcomes in their pricing strategies. At the onset of the year, the S&P 500 experienced a decline of roughly 30% in its valuation. However, it has recovered after this decline, currently standing at approximately 90% of its pre-COVID-19 value when composing this text (Figure 5).

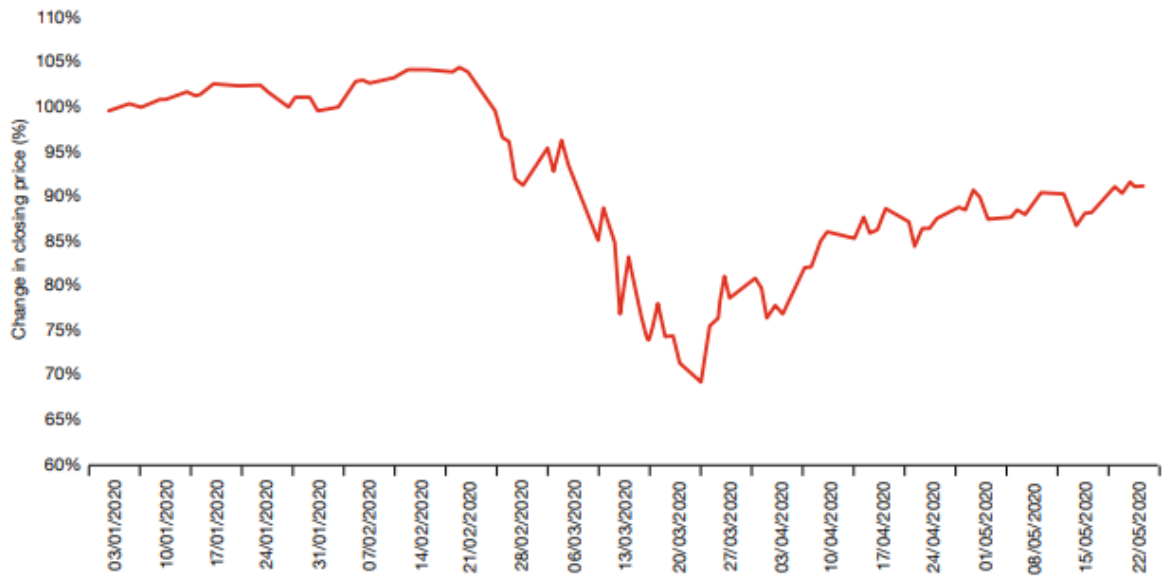


Figure 5. Price of the Rebased S&P 500

[<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

Furthermore, there was a notable surge in trading volumes towards the conclusion of February, coinciding with a period of market distress and widespread selling.

Subsequently, trade volumes have exhibited a persistent state of volatility. March and April experienced an atypical surge when compared to the preceding months. Based on the presented graph, it can be observed that the FTSE 100 Index had the most significant variations in terms of trading volume.

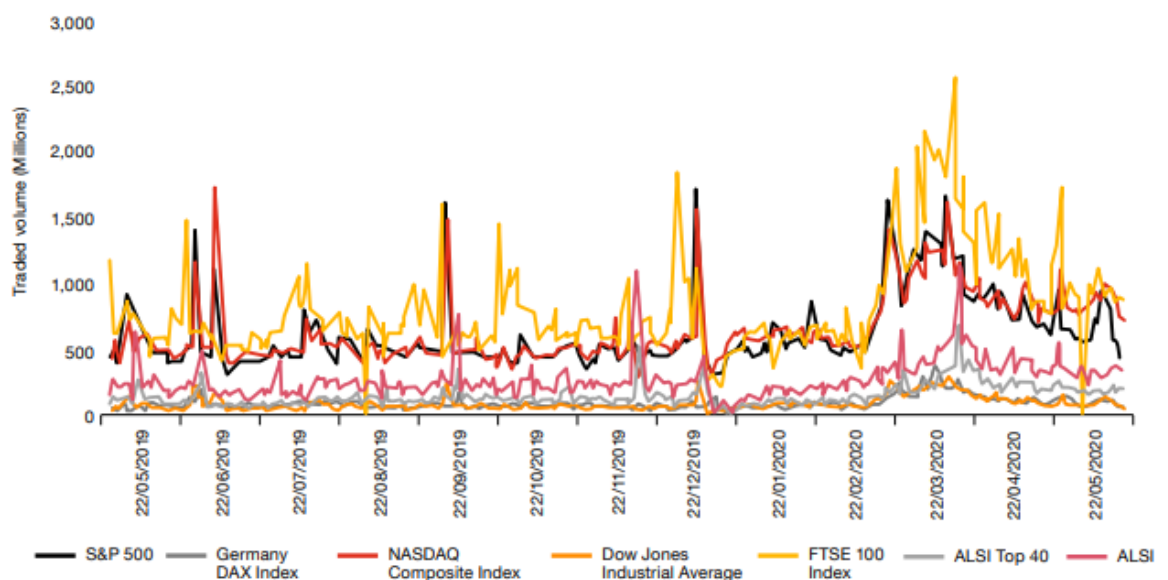


Figure 6. Volumes of Equity Transactions

[<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

The Chicago Board Options Exchange (CBOE) Volatility Index (V.I.X.) is a metric for assessing stock market volatility, explicitly indicating the market's anticipation of volatility over 30 days. Investors, research analysts, and portfolio managers utilize the V.I.X. to assess market risk, anxiety, and stress before making financial decisions. The V.I.X. has achieved its highest closing level, exceeding that observed in 2008. From late February to late March, there was a notable surge in the V.I.X. volatility index, with its value rising from around 15% to 80%. The South African Volatility Index (SAVI) is the counterpart to the V.I.X. in South Africa. Notably, the SAVI had a delayed response compared to the V.I.X., which can be attributed to the timing of South Africa's initial COVID-19 case report on March 5, 2020. The SAVI had significant growth during its peak, rising from around 15% to 50% (Figure 7). As of May 2020, these measures have not yet reverted to their pre-COVID-19 values and remain around twice as high as the level observed before the onset of 2020.

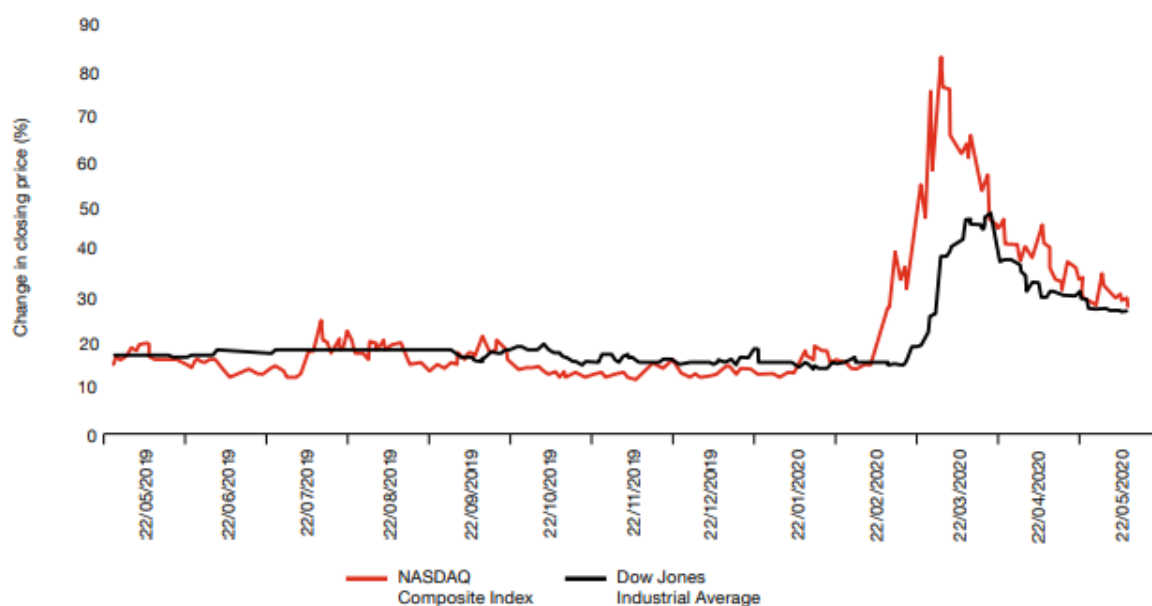


Figure 7: Indices of Equity Volatility

[<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

The elevated levels of volatility discussed above can be attributed to several potential factors. These include the pandemic's severity, the virus's rapid spread, and a significant fatality rate. These factors collectively contribute to declining investor confidence since they introduce heightened uncertainty over future outcomes. Furthermore, it is plausible that this situation may lead to a certain level of policy uncertainty among governments as each nation adopts distinct approaches in response to the crisis. The extensive interdependence among global financial markets and cross-border demand and supply

chains implies that the ramifications of the pandemic are likely to persist on a broad scale. As previously discussed, the COVID-19 pandemic will affect different economic sectors differently. Figure 8 illustrates the performance of several industries listed on the Johannesburg Stock Exchange (J.S.E.) over six months. As of the conclusion of February 2020, many sectors witnessed a decrease in performance. Between March and April 2020, the FTSE/JSE SA Listed Property sector saw a substantial price decrease of nearly 50 percent. The FTSE/JSE Telecommunications and FTSE/JSE Financial sectors ranked the second largest, losing almost 42%. Simultaneously, there has been an upward trend in the prices of the FTSE/JSE Technology and Gold Mining sectors.

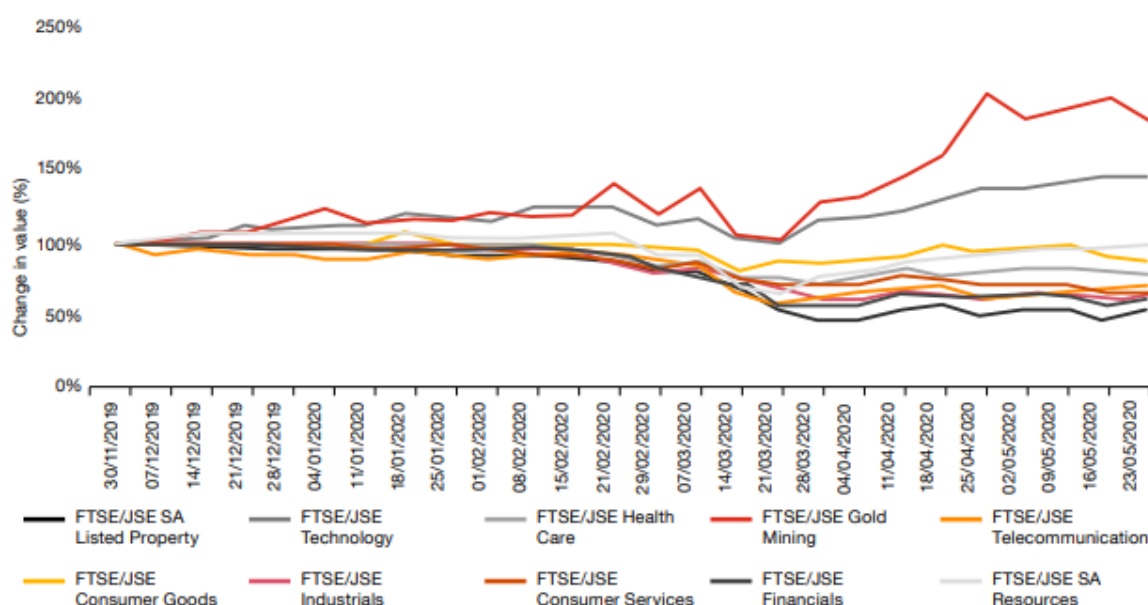


Figure 8. J.S.E. Sector Specific Indices

[<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

The increase in the Gold Mining index may be attributable to investors purchasing gold assets as a haven and South African gold miners exhibiting enhanced performance due to a weaker Rand.

Bond returns

There has been a simultaneous decrease in government bond rates and stock market volatility in highly developed financial markets. With the escalating concerns about COVID-19, it is common for investors to exhibit a preference for secure assets, leading to a decrease in the bond rates of countries with low-risk profiles. Furthermore, financial institutions have employed monetary policy to invigorate underperforming economies.

Policymakers use strategies to counteract deflationary pressures by implementing interest rate reductions during economic distress. This policy action leads to a rise in bond prices and a subsequent decline in bond yields. This phenomenon leads to decreased borrowing costs for firms and the government, stimulating expenditure.

In March 2020, the yield on 10-year United States Treasury bonds reached its lowest point in the previous century. Negative interest rates have increasingly gained prominence in numerous wealthy nations, including the Eurozone and Japan, while others, such as the United States, are approaching the threshold of zero or potentially negative rates. Despite the volatility, the bond yields reached a state of stability at reduced levels, which can be attributed to the prevailing gloomy global economic outlook at the time. Significantly, the profit on the 10-year USD bond decreased by a factor of four compared to its level one year before. On the other hand, there was a notable rise in the government bond yields of South Africa, which can be attributed to the impact of Moody's rating downgrade in March 2020, as well as the aversion towards emerging markets resulting from the COVID-19 pandemic. Specific investing mandates, then, prohibited the inclusion of South African bonds due to their diminished credit rating.

Consequently, there was a rise in the issuance of domestic bonds, leading to a decline in their prices and a corresponding increase in their yields. Furthermore, during periods of uncertainty, investors tend to exhibit a greater aversion to risk. Consequently, South African bonds may be perceived as assets carrying a higher level of risk, leading to their frequent sale in volatile financial markets. Figure 9 illustrates the bond yield of South Africa throughout the year, juxtaposed with the bond yields of other emerging nations that have experienced similar patterns due to the impact of the COVID-19 pandemic. It is worth noting that South Africa witnessed a more significant rise in yields than other emerging nations. This phenomenon can be attributed to the downgrades in its credit rating. Furthermore, Brazil's bond yields experienced a significant increase at the onset of May due to a surge in COVID-19 cases.

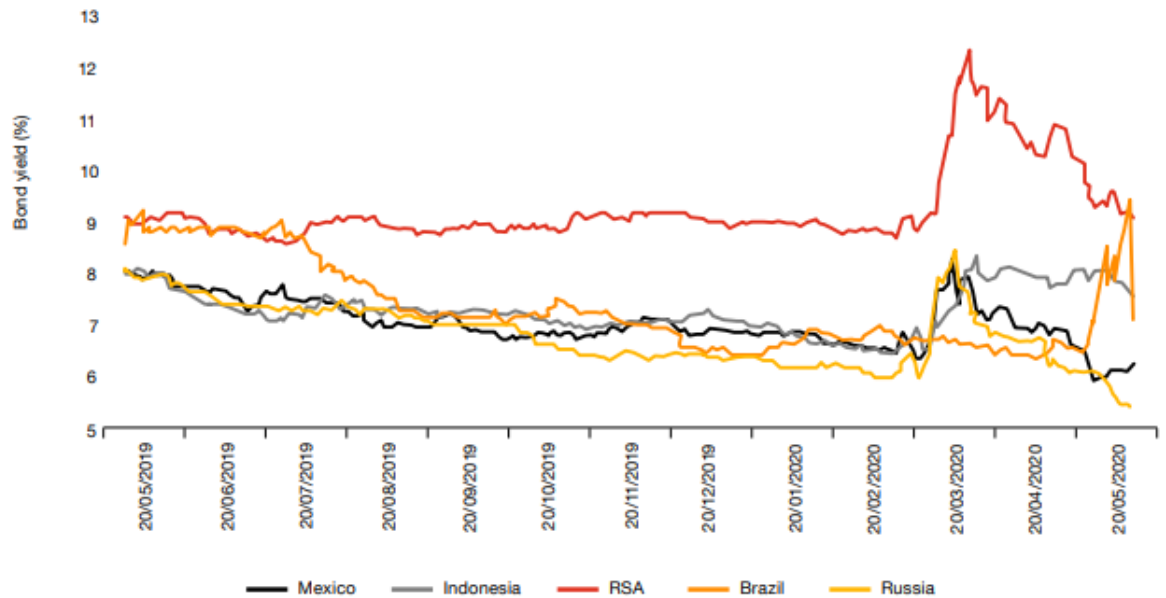


Figure 9. Yields on 10-Year Bonds in Emerging Economies
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Foreign currency

The depreciation of emerging market currencies against the United States Dollar ('USD') was very substantial since investors perceive these currencies as risky in an unpredictable market. The South African currency, the Rand (ZAR), experienced a significant decline, reaching its lowest value in over four years. The South African Rand (ZAR), Mexican Peso (M.X.N.), and Brazilian Real (B.R.L.) experienced significant fluctuations in value since the commencement of 2020. The Brazilian Real (B.R.L.) experienced a depreciation of 30% relative to other currencies from the beginning of January 2020. In contrast, the Chinese Yuan (C.N.H.) exhibited resilience in maintaining its value despite its association with the outbreak of the COVID-19 epidemic. Figure 10 illustrates the relative performance of emerging market currencies concerning the U.S. dollar from the commencement of the year 2020.

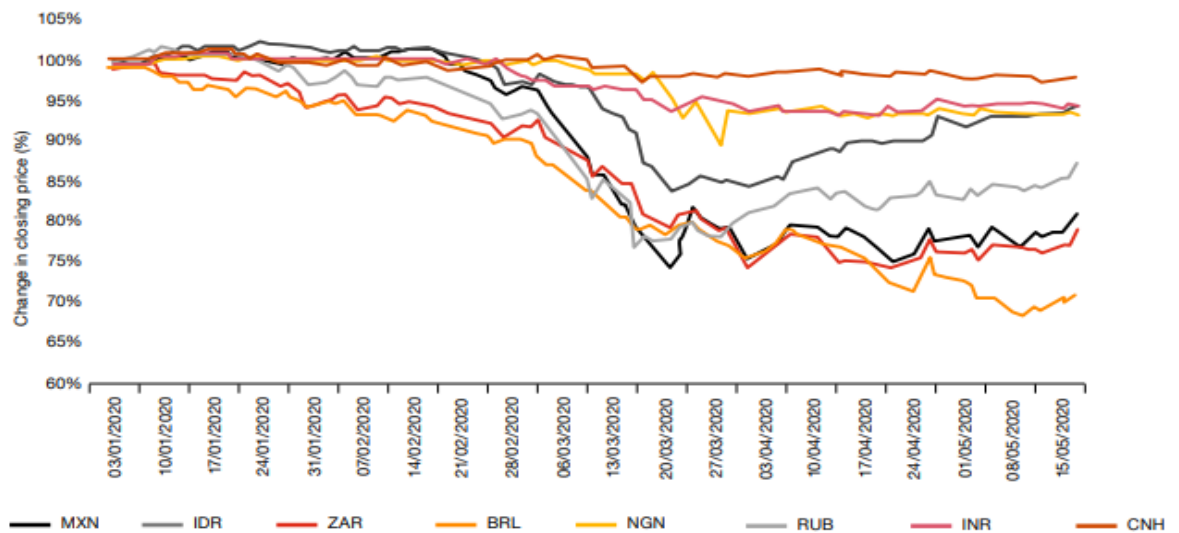


Figure 10. Foreign exchange of emerging markets versus U.S. Dollar
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Developed markets have witnessed a currency appreciation relative to the USD during this period.

Commodities

The price of U.S. crude oil experienced significant strain due to the global COVID-19 pandemic and other decisions taken by oil companies. Consequently, the market value of a crude oil unit declined to less than \$15, marking the lowest point observed in the preceding two decades. The historical occurrence of oil futures contracts trading below zero occurred on April 20, 2020. The global oil demand experienced a significant decline due to decreased economic activity worldwide, which can be attributed to the implementation of social isolation and lockdown measures aimed at curbing the transmission of the virus. During this period, oil producers persisted in their operations despite declining liquidity, leading to a notable disparity between the supply and demand on the market. The occurrence of negative oil futures prices is expected to lead to the initiation of operational closures by certain energy corporations.

The impact of the COVID-19 pandemic extended to various other commodities. Figure 11 illustrates the downward trend in market pricing for metals, including aluminium and platinum. During March 2020, the spot price of platinum had a significant decline of 45 percent, ultimately reaching its lowest point in 17 years. The observed phenomenon could be attributed to a decrease in the demand for platinum, which was somewhat offset by a reduction in supply due to a breakdown in the South African smelting process. The

imposed limitations have also had an impact on mining operations. Despite the relatively volatile nature of the market in March 2020, the value of gold continued to increase due to its persistent perception as a safe-haven asset.

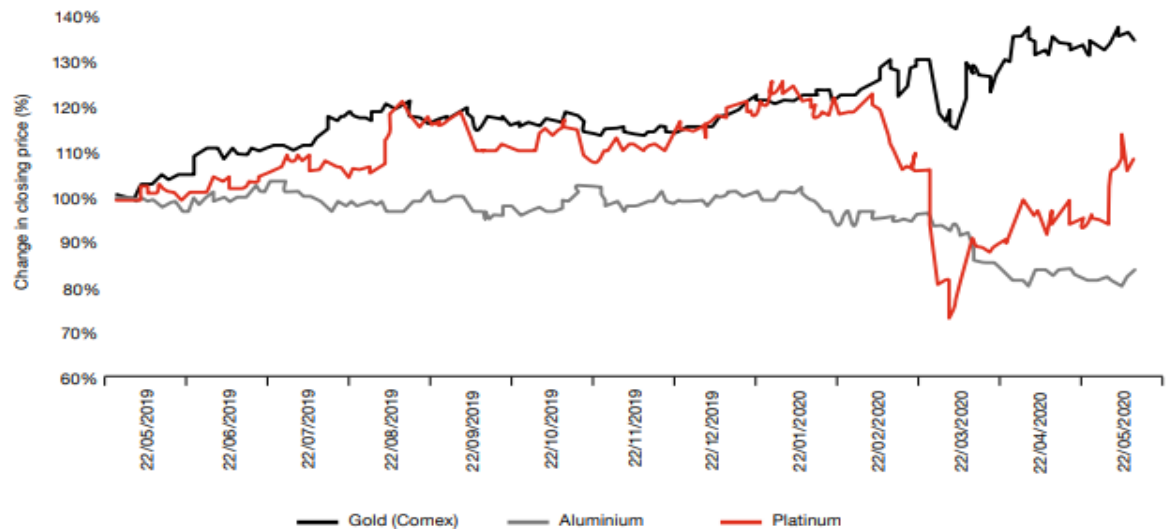


Figure 11. Metals Spot price

[<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

The agricultural industry experienced the most negligible impact, as evidenced by the constant wheat prices. Nevertheless, the effect of COVID-19 on the market was evident, as depicted in Figure 12. Corn and cocoa encountered a decrease in their respective values in March 2020. This fall can be attributed to the imposition of limitations on restaurants and food service establishments. The decline of the global textile industry resulted in a significant reduction in cotton value, estimated to be over 35%.

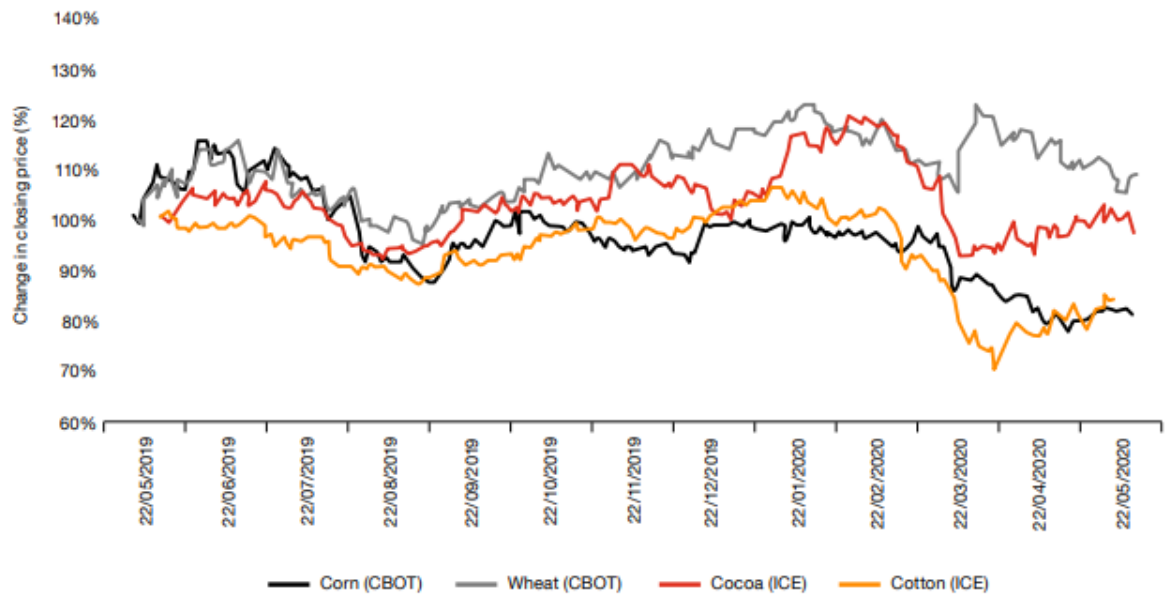


Figure 12. Future Agriculture Price
[\[https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf\]](https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf)

Spreads between various credit ratings

As the COVID-19 pandemic persisted, numerous businesses faced significant challenges, leading many corporations to exhaust their credit lines and defer payments whenever feasible. The phenomenon above has commonly resulted in a decrease in creditworthiness and a rise in the likelihood of default, as seen by the expansion of market credit spreads. Figure 13 illustrates the variations in sovereign credit spreads throughout three distinct periods: January 2020 (referred to as 'Pre-COVID-19'), March 2020 (referred to as 'throughout'), and May 2020 (referred to as 'Current'). The credit spreads about sovereign entities such as South Africa, Brazil, Mexico, and Indonesia experienced a notable expansion. The credit spreads for South African government bonds denominated in U.S. dollars ('SOAF') had a widening trend from January 2020 to May 2020. Across all maturities, the average increase in credit spreads amounted to 170 basis points (bps). Notably, April 2020 witnessed the highest surge, with a maximum increase of 325 bps. Later, the six-month spread of the South African Office of the Actuary Foundation (SOAF) credit observed an approximate increase of 120 basis points about the initial day a COVID-19 case was officially confirmed within the borders of South Africa. When comparing identical dates, it was observed that the 10-year SOAF credit spread exhibited an estimated rise of 100 basis points. The six-month stretch of the SOAF reveals a relatively higher growth rate over the observed period than longer-term values. This trend could be attributed to governments grappling with heightened uncertainty.

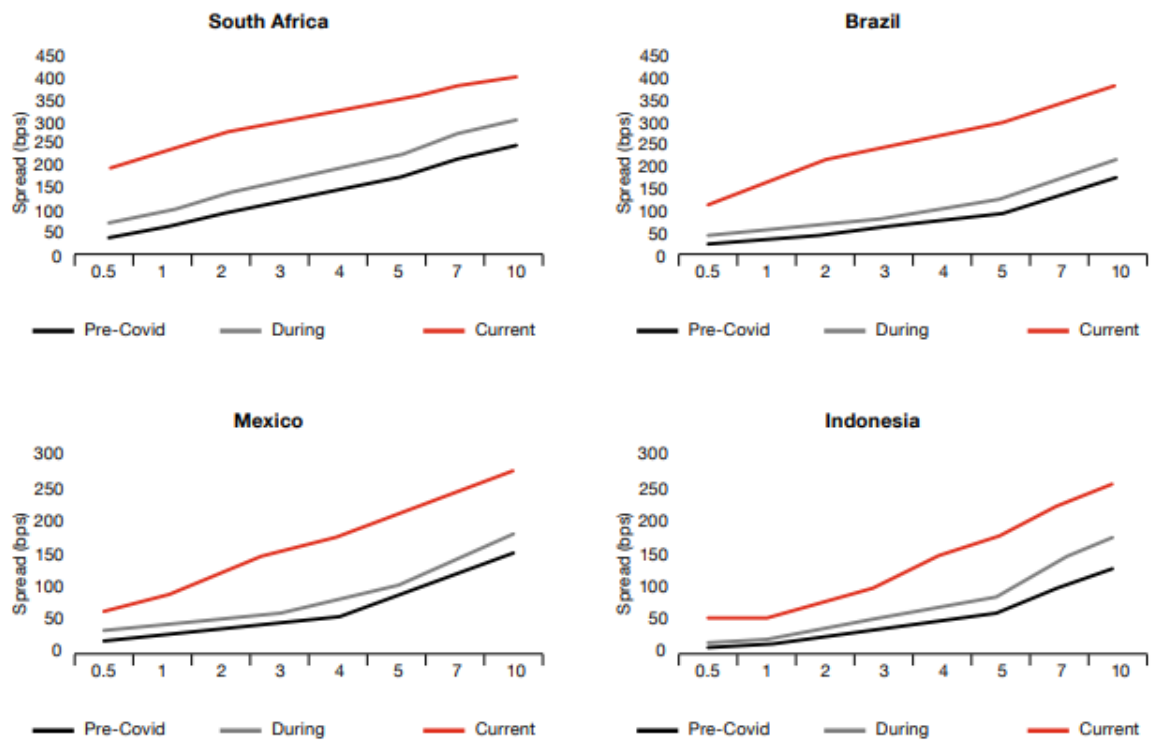


Figure 13. The credit ratings spread between developing markets
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Similar shifts in credit spreads were observed among other firms in South Africa. An analysis of the fluctuations of credit spreads conducted over time for four publicly traded firms in South Africa is illustrated in Figure 14 (<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>). The sectors of Companies A, B, C, and D are as follows: Company A operates in the energy sector, Company B is involved in the oil and gas industry, Company C functions in the mining sector, and Company D is engaged in the production of beverages and tobacco. The six-month credit spread of Company A had a fourfold increase, whereas the six-month credit spread of Company B witnessed an approximate twentyfold increase. In terms of absolute values, the widening of credit spreads for Company C and Company D is not as pronounced as that of Company A and Company B. Nevertheless, there are notable relative increases observed at specific intervals. This phenomenon can be attributed to the sector in which these entities function or their robust financial standing before the onset of the COVID-19 pandemic. Hence, it instilled confidence among investors that the likelihood of a default was not imminent.

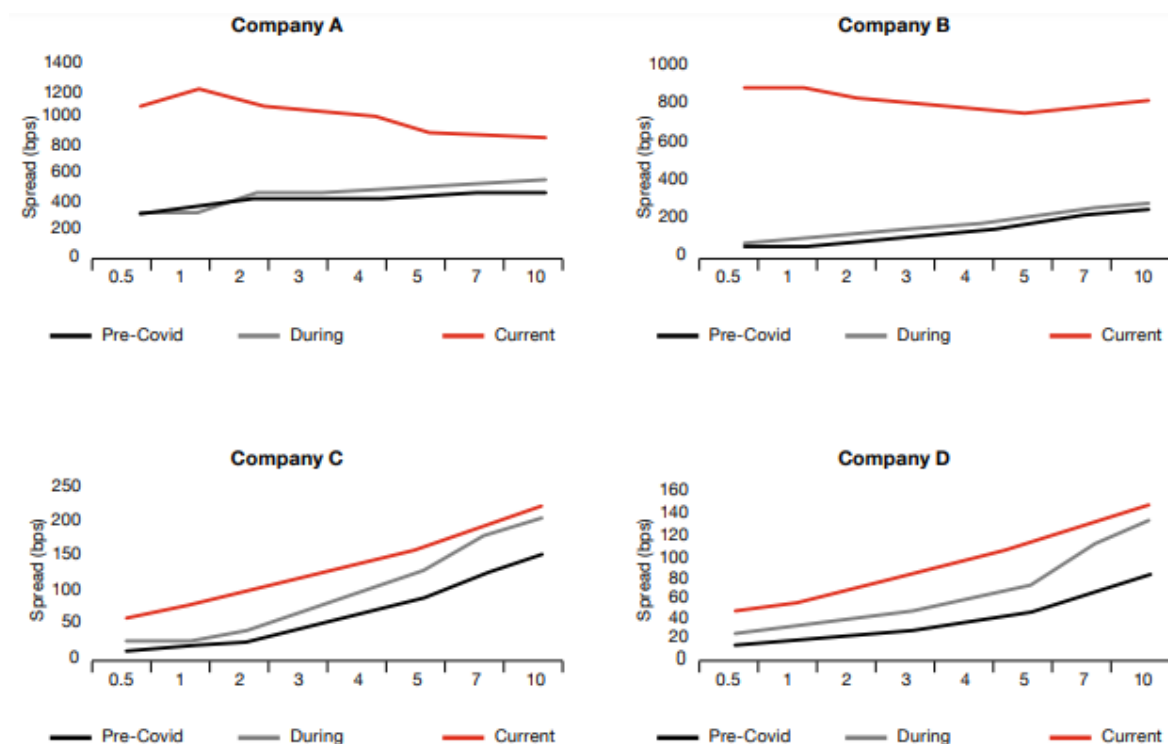


Figure 14. The credit ratings spread between companies from different sectors in South Africa [<https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf>]

B. Financial Impact of COVID-19 on South African Universities Higher Education

According to the Higher Education Department, the financial consequences of the pandemic on university spending are estimated to surpass R3.8 billion. Minister of Higher Education Blade Nzimande disclosed this information in a written response to a parliamentary enquiry by Belinda Bozzoli of the Democratic Alliance (DA). The Member of Parliament from the Democratic Alliance expressed a desire to ascertain the impact of the reduction in the university block grant of R2.5bn on the regular budget of each university. According to Nzimande, the COVID-19 pandemic has already impacted everyday university expenses, leading to significant cost savings due to the postponement of various events, including the cancellation of conferences and restrictions on travel and accommodation. Furthermore, Nzimande asserted that there had been cost reductions in essential utilities such as power and water. According to Nzimande, when considering several elements, such as the required money for assisting students financed by the National Student Financial Aid Scheme (NSFAS) in obtaining computers, the whole financial consequence amounts to R3,850.6 billion. Additionally, it was indicated by the speaker that a portion of the sum was derived through the internal reallocation of unutilized

grants, amounting to R745 million, and from the interest accrued on unutilized grants at institutions, totalling R1.332 billion.

The National Student Financial Aid Scheme (NSFAS) allocated funding to provide advances on allowances designated explicitly to finance laptops. This initiative aimed to benefit the university and TVET college students, with a total budget of R2.5 billion. In this essay, I will discuss the impact of technology on modern society. Specifically, according to institutional estimates, a total of R1.8 billion would be necessary to ensure compliance with campus health and safety regulations throughout the reintegration of staff and students, as outlined in their respective return-to-campus plans. According to Nzimande, specific proposals included items with high costs deemed unneeded, leading the department to express its inability to endorse such goods. According to the minister, his department has identified R608 million, pending ministerial permission, to provide financial help to institutions to implement health and safety procedures.

2.5.5 Psychological Effects of the COVID-19 Epidemic on South African Higher Education Students

The presence of the pandemic in the South African population poses an additional challenge to a society that has already experienced multiple instances of collective trauma (Atwoli et al., 2013). According to a study published in *The Lancet Global Health* (2020), it is anticipated that African countries will have severe economic and health consequences due to the pandemic, which can be described as "catastrophic." To comprehensively address mental health in South Africa, it is imperative to consider the sociohistorical environment (Chew et al., 2020). A significant number of individuals in South Africa experience the multifaceted consequences of enduring and recurring trauma, leading to the development of complex post-traumatic stress disorder (Herman, 1992, p. 377; Naidu, 2017, p. 772). The phenomenon of everyday trauma, sometimes known as "common shock," is highly prominent in South Africa due to the persistent presence of various forms of violence, such as hijackings, house invasions, robbery, rape, murder, and gangsterism (Weingarten, 2003, p. 1). The general population exhibits a significant prevalence of trauma exposure, as evidenced by a reported lifetime exposure rate of at least one potentially traumatic event for 73.8% of individuals (Atwoli et al., 2013).

The COVID-19 pandemic is anticipated to worsen pre-existing mental health disorders due to the trauma experienced (Montemurro, 2020). In a country characterized by significant

economic disparities, a considerable proportion of the South African population is below the poverty threshold and in densely populated households that often consist of multiple generations. The prevalence of depression, anxiety, gender-based violence, and child abuse and neglect exhibit a significant level of occurrence. South African social scientists expect to observe comparable trends to those surveyed in the United States, where African Americans have experienced disproportionately high rates of COVID-19 infections and fatalities, which have been linked to previous instances of systemic racism (Andrews, Harshbarger, & Romer, 2020). Despite the abolition of apartheid-era laws, there remains a persistent and profound presence of structural and cognitive racism (Durrheim, Mtose, & Brown, 2011). Similar to other regions globally, mental health professionals in this context might anticipate a rise in the prevalence of post-traumatic stress disorder (PTSD), mood disorders, anxiety disorders, phobias, and obsessive-compulsive disorders (Banerjee, 2020; Torales, O'Higgins, Castaldelli-Maia, & Ventriglio, 2020).

The delusions experienced by individuals with psychosis are often characterized by concerns related to contagion, contamination, and paranoia surrounding matters of sickness and physical well-being. Additionally, when a community experiences widespread fear, hopelessness, and a sense of powerlessness, it might potentially lead to a significant increase in cases of depression (Druss, 2020). To adequately equip anaesthetists for the potential psychological pressures they may encounter in the context of their work during the COVID-19 pandemic, their national professional body provided mental health support training. Similar to the situation in China, there was an initial refusal or delay in accepting these offers (Banerjee, 2020; Chen et al., 2020; Huang et al., 2020). Lessons learned from various contexts suggest the importance of being ready to provide mental health interventions to frontline workers during widespread crises. According to Kang et al. (2020) and Montemurro (2020), Managers and hospital chief executives in at least one province in South Africa had training on mental health supportive measures, including the establishment of a conducive work environment, identification of health workers at risk, and the provision of psychological first aid. This training was conducted through an online platform.

2.6 Concept of Online Learning in South Africa

According to Onaolapo and Ojo (2023), technology plays a crucial role in education in the current era. Integrating technology in education has led to a transformation in teachers'

instructional practices. This shift involves a departure from the conventional approach, which typically positions teachers as mere conveyors of information. Instead, teachers now adopt a more adaptable role, functioning as facilitators, mentors, and motivators. Their primary objective is to encourage student engagement and foster a conducive environment for learning (Onyema & Deborah, 2019). Technology plays a pivotal role in enabling many modes of education, such as remote, distance, virtual, blended, mobile, distributed, machine, ubiquitous, deep, cooperative and collaborative learning. Digitalizing various facets of education has become increasingly prevalent, necessitating a move to online learning for education stakeholders, including students.

According to Onyema et al. (2019), using suitable educational technology enhances the accessibility of learning resources, including Massive Open Online Courses (MOOCs). It facilitates the implementation of various learning methodologies to cater to the requirements of a wide range of learners. Online education is an inclusive framework that utilises technological tools and platforms to facilitate remote teaching and learning activities. The efficacy of online education is contingent upon various aspects, encompassing reliable internet connectivity, proficient learning software, adept digital competencies, widespread availability, and unrestricted access to technological resources. Online education platforms are crucial in facilitating inclusive education and online learning. The origins of online education may be traced back to distance education and the advent of digital technologies that enable the effective and dependable dissemination of lectures, virtual classroom sessions, and various instructional materials and activities through the Internet (Onlineeducation.com, 2020). The widespread adoption of Internet and mobile technologies worldwide presents an opportunity to leverage online education platforms to address educational disparities and mitigate the global illiteracy crisis. Many online educational tools and platforms exist to support remote learning, particularly during widespread outbreaks such as the current Coronavirus pandemic. The following technology tools/platforms are enumerated by Onyema et al. (2020):

i. GoToMeeting.com	xix. learnopia.com
ii. Skype.com	xx. Peer 2 Peer University (p2pu.org)
iii. Google Classroom/Open Online education (edu.google.com)	xxi. Teachers pay Teachers (teacherspayteachers.com)
iv. Youtube.com	xxii. Thinkific (thinkific.com)
v. Blackboard.com	xxiii. MOOC.org

vi. udemy.com	xxiv. openculture.com
vii. coursera.org	xxv. academicearth.org
viii. memory.com	xxvi. iTunes Free courses (apps.apple.com)
ix. alison.com	xxvii. lessonpaths.com
x. edx.org	xxviii. memrise.com
xi. easyclass.com	xxix. funbrain.com (for kids)
xii. vedamo.com	xxx. whyville.net (for teens)
xiii. Khanacademy.org	xxxi. Edmodo (edmodo.com)
xiv. TED-Ed (ed.ted.com)	xxii. Schoology (schoology.com)
xv. Codeacademy.com	xxiii. class dojo (classdojo.com)
xvi. Stanford Online (Online.stanford.edu)	xxiv. Google Hangouts (hangouts.google.com)
xvii. futurelearn.com	xxv. Zoom (zoom.us)
xviii. rcampus.com	xxvi. Whatsapp.com

The utilization of educational technologies enables the implementation of online education, fostering interactions, connections, and partnerships between students and teachers. Utilizing this technology improves the quality of teaching and learning encounters, facilitates the design of educational materials, enables the sharing of course information, supports the evaluation of student performance, and facilitates the provision of feedback. Educators could connect and engage with their students remotely, regardless of their location, enabling flexible scheduling of lectures to accommodate individual convenience. Educators and students have the potential to maximize the utilization of these technologies to complement traditional classroom instruction and enhance their proficiency in digital competencies, aligning with the evolving patterns in the field of education. Furthermore, acquiring technological information enhances educators' and students' interest, competence, confidence, creativity, employability, and productivity. It also equips them with the necessary skills to prepare for future challenges.

2.7 Challenges of Online Higher Education Learning

The global pandemic caused by the breakout of the Coronavirus has necessitated the transition of a significant number of pupils to remote learning and studying from their own homes. This phenomenon is not novel, as the house has historically been a central location for informal education, fostering learning opportunities. The adoption of remote learning has emerged as a prevailing trend among students. Based on the findings of Education Task (2020), many university students prefer studying within the confines of their residences. This inclination is attributed to the convenience and accessibility afforded by this approach, as learners can access all necessary resources and materials without the need to venture outside their immediate surroundings physically. Nevertheless, the implementation of remote education poses significant difficulties for educators, learners, and parents, particularly in underdeveloped nations where access to technology and its integration into educational systems is limited.

In addition to the financial implications associated with accessing online education, various other constraints can impede the seamless pursuit of remote learning. These include challenges related to network connectivity, inadequate power supply, potential distractions, limited digital literacy, difficulties in accessing educational resources, and issues with the availability of necessary tools and materials. Additionally, there exists the problem of time allocation for acquiring new technologies that may be necessary for remote learning and the presence of internal or external sounds originating from neighboring individuals or communities. The issue of unequal technology access is a significant worry for numerous nations. Prolonged school closures have the potential to deny millions of pupils, particularly those in developing countries, rural regions, and individuals with special needs, the opportunity to receive an education. UNESCO acknowledged the issues above and undertook initiatives to support educators and students in the impacted nations by offering complimentary software enabling remote education and facilitating teaching and learning from their residences.

According to Catherine (2020), UNESCO has curated an online guide comprising distance learning applications and supplementary materials in response to the impact of school closures resulting from the Coronavirus pandemic. The students were required to maximize the benefits of the Coronavirus-induced school closures by enhancing their digital learning abilities and cultivating effective study habits at home. The problems presented by the

Coronavirus pandemic have the potential to catalyze learners to improve their problem-solving skills and digital proficiencies.

3 Methodology

The present study employed a comprehensive and systematic review methodology. (Betthausen *et al.*, 2023, Kauhanen *et al.*, 2023, Adefarati *et al.*, 2023). This is a type of review that selects and synthesizes all available evidence using repeatable methods. An extensive literature review was conducted on the COVID-19 pandemic and its impact on students in South Africa and globally. In addition to evaluating literature, secondary data were collected from other sources such as newspapers, journals, websites, and reports. This review employed a comprehensive strategy for conducting a literature search. The initial search on Google's search engine utilized the keywords "COVID-19" and "South African higher education systems" to get items that may not have undergone formal peer review, such as newspapers, websites, and reports. Peer-reviewed journal and conference papers, as well as other specialized publications, were sought through various databases, including IEEE-Xplore, Science Direct, Google Scholar, Web of Science, Scopus, and ResearchGate (Mthukuse *et al.*, 2023; Onaolapo *et al.*, 2023). The initial search yielded a total of 3200 articles. Subsequently, a screening process was conducted to exclude articles with titles unrelated to the subject matter and articles not published in English. As a result, 260 articles were excluded from further consideration. A total of 278 articles were excluded as a result of the additional elimination of websites and duplicates. Additional refinement based on chronological criteria was conducted, specifically focusing on the time spanning from 2017 to 2023. This selection process resulted in a final pool of 81 pertinent articles deemed suitable for further examination and analysis. Subsequently, a framework for implementing sustainable strategies to mitigate the COVID-19 pandemic was developed. Table 1 shows a summary table about the main categories of the articles.

Table 1. A summary of the article categories

S/n	Source/Reference	Category
1.	Aborode <i>et al.</i> 2020, Adefuye <i>et al.</i> 2021, Adelowotan 2021, https://www.educationtask.com/advantages-and-disadvantages-of-studying-at-home.html , https://en.unesco.org/covid19/educationresponse/consequences , Alex 2022, Anoush <i>et al.</i> 2011, Armoed 2021, https://en.unesco.org/news/covid-19-educational-disruption-and-response , Cranfield <i>et al.</i> 2021, Mhlanga 2021, Dison <i>et al.</i> 2022, Du Plessis <i>et al.</i> 2022, Gumede and Badriparsad 2022, https://en.wikipedia.org/wiki/Impact_of_the_2019-20_coronavirus_pandemic_on_education , Landa <i>et al.</i> 2021,	Educational

	Mahaye 2020, Mahlaba 2020, Gustafsson and Nuga 2020, Mbandlwa 2021, Mbhiza 2021, McGowan 2020, Mhlanga 2022, Mncube <i>et al.</i> 2021, Motala and Menon 2020, Onyema 2019, Onyema and Deborah 2019, Onyema <i>et al.</i> 2019, Shu 2020, Stanistreet <i>et al.</i> 2021, Tadesse and Muluye 2020, https://www.onlineeducation.com/ ,	
2	https://www.iol.co.za/news/politics/covid-19-financial-impact-on-sa-universities-stands-at-over-r38bn-f41d76f5-27d0-4071-9c6e-f725cfe0e861 , https://www.pwc.co.za/en/assets/pdf/financial-market-impacts-of-covid-19.pdf ,	Financial
3	Adefuye <i>et al.</i> 2021, Ahmad <i>et al.</i> 2020, Chen <i>et al.</i> 2020, https://english.elpais.com/society/2020-03-12/basque-country-galicia-and-murcia-closeschools-in-bid-to-slowcoronavirus.html?fbclid=IwAR11_sqr1YCerswbnRvnO7UgKr9quMVvehQ9tgKdxkwtlidamgPitwIIBNM , http://dx.doi.org/10.1016/S2214-109X(20)30134-0 ,	Health
4	Atwoli <i>et al.</i> 2013, Banerjee 2020, Chew <i>et al.</i> 2020, Druss 2020, Olawale <i>et al.</i> 2021, https://www.universityaffairs.ca/features/feature-article/how-mental-health-services-for-students-pivoted-during-covid-19/ , Huang, <i>et al.</i> 2020, Jung and Jun 2020, Kang <i>et al.</i> 2020, Montemurro 2020, Omodan <i>et al.</i> 2020, Otu <i>et al.</i> 2023, Sani <i>et al.</i> 2020, Naidu 2020, Tomita <i>et al.</i> 2019, Torales <i>et al.</i> 2019, Usher <i>et al.</i> 2020, Venkatesh and Edirappuli 2020,	Psychological
5	https://www.educationtask.com/advantages-and-disadvantages-of-studying-at-home.html , https://en.unesco.org/covid19/educationresponse/consequences , Alvarez 2020, Aristovnik <i>et al.</i> 2020, Christakis and Christakis 2020, Duffy and Ryan 2020, Ojo and Onwuegbuzie 2020, Onalapo and Ojo 2023, Procentese <i>et al.</i> 2019, Hodel and Okiror 2020, Holcombe 2020, https://www.nature.com/articles/d41586-020-03370-6 , Czerniewicz <i>et al.</i> 2020, Naidoo and Cartwright 2022, https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf ., Onyema <i>et al.</i> 2020, https://ewn.co.za/2019/11/18/ramaphosa-our-gender-based-violence-plans-are-well-on-their-way , Patrick <i>et al.</i> 2021, Lembani <i>et al.</i> 2020, https://www.middleeastmonitor.com/20200309-saudi-closes-schoolsuniversities-because-of-coronavirus/ , Sen and Antara 2018, Sen <i>et al.</i> 2019,	Others/ General

	<p>https://learningenglish.voanews.com/a/unesco-290-million-students-stayhome-due-to-coronavirus/5317148.html, https://www.afro.who.int/sites/default/files/2021-10/WHO%20Covid-19%20Response%20in%20South%20Africa_Country%20Brief.pdf</p>	
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4 Results and Discussion

4.1 The preparedness of the education system to address the unexpected pandemic

According to Margaryan *et al.* (2011), students use various technologies for socialization and learning. Students use mobile phones, Wikipedia, Google, and institutional VLEs (Virtual Learning Environments). The COVID-19 pandemic has shot up the utilization of these technologies in South African higher institutions (and globally) more than in the pre-COVID-19 pandemic era. The need for social distancing and the pressure of lockdowns forced the sector to embrace various existing technologies to ensure that remote learning becomes a reality.

This study has identified a range of literary works that examine and assess the education system's readiness to address unforeseen demands posed by a pandemic. The findings have been succinctly described in Table 2.

Table 2. Results showing the preparedness of South African higher educational systems to address the unexpected pandemic

S/n	Reference	Description and Discussion
1	Plessis <i>et al.</i> , 2022	The authors engaged in a comprehensive analysis and evaluation of the preparedness of the educational system to address unforeseen requirements arising from a pandemic. The authors emphasized that several higher education establishments have implemented business continuity strategies in response to past occurrences such as the #feesmustfall movement. However, it remains uncertain if these plans sufficiently equipped institutions to address the challenges posed by the COVID-19 epidemic effectively. The authors also observed that the epidemic has shown deficiencies and susceptibilities within the system, namely about technology accessibility and the capacity for online learning. Moreover, the authors highlighted the varying degrees of readiness among universities in transitioning from traditional classroom instruction to online learning, suggesting the presence of a systematic disparity.
2	Landa <i>et al.</i> , 2021	The authors conducted a comprehensive analysis and assessment of the education system's readiness to respond effectively to unforeseen demands imposed by a pandemic. The absence of emergency

		<p>protocols to address such circumstances was emphasised, and the diverse learner contexts continued to provide a substantial challenge to South Africa's education delivery during the COVID-19 pandemic. Additionally, they proposed the implementation of timely intervention and capacity-building programs to equip instructors efficiently and students with the necessary skills to transition from conventional to online learning environments.</p>
3	<p>Stanistreet <i>et al.</i>, 2021</p>	<p>The authors conducted a comprehensive analysis and assessment of the education system's readiness to respond effectively to unforeseen demands imposed by a pandemic. It was discovered that numerous methods exhibited a lack of preparedness for the crisis as a result of pre-existing disparities, financial limitations, and implementation of austerity measures. The implementation of remote learning in specific areas further exacerbated existing inequalities. Furthermore, the researchers discovered that academic faculty frequently encountered challenges transitioning to online instruction due to sluggish internet connectivity and insufficient training.</p>
4	<p>Naidoo and Cartwright, 2022</p>	<p>The authors identified the quick transition to E-learning platforms in South Africa due to the COVID-19 pandemic as a process that presented significant challenges and disruptions. In addition to addressing the issue of unpreparedness and levels of success, the author also explores the necessity of technical resources and emphasizes the significance of training staff and students in utilizing technology platforms. The writers conducted a thorough assessment of the government's initiatives in distributing laptops to students and examined the challenges that emerged throughout the implementation of this endeavor.</p>
5	<p>Omodan <i>et al.</i>, 2021</p>	<p>The authors observed that the emergence of the COVID-19 epidemic resulted in implementing online education with little readiness, particularly in rural areas where the necessary infrastructure for online learning was mainly absent. The abrupt transition to remote learning posed various difficulties for students and faculty members</p>

		in higher education establishments. These obstacles encompassed limited access to resources, inadequate training, and insufficient availability of online materials. Additionally, the process of assessing and evaluating student performance was further complicated.
6	Otu <i>et al.</i> , 2023	The authors suggested that the system exhibited a significant lack of preparedness. The authors emphasized that the rapid and unanticipated transition to remote instruction and learning due to the global health crisis presented substantial difficulties. The factors mentioned above encompassed insufficient training for students, academics, and support personnel in online platforms, challenges about the possession and accessibility of essential resources such as internet-enabled laptops, and an unreliable electrical supply. The authors also observed that numerous scholars encountered difficulties transitioning to online platforms and faced challenges acquiring the necessary technical competencies for integrating technology into their pedagogical practices. In addition, students encountered challenges related to their limited knowledge of online platforms, insufficient access to laptops, and inadequate data and internet connectivity.
7	Aborode <i>et al.</i> , 2020	The authors emphasized the insufficient readiness of numerous higher education institutions in Africa, namely in the Sub-Saharan region, to effectively shift to online learning in response to the onset of the epidemic. The participants also discussed establishing educational systems with contingency capabilities to navigate forthcoming dangers effectively. The authors propose a comprehensive strategy encompassing the participation of all relevant parties and forming a higher education task group to evaluate the circumstances and propose prompt and temporary actions.

Table 2 shows some measures highlighting South African higher education systems' preparedness for the COVID-19 pandemic. It is noted that past occurrences, like the #feesmustfall movement, have made many higher institutions implement business continuity strategies (Plessis *et al.*, 2022). However, the authors observed that there is the presence of a systematic disparity in technology accessibility and the capacity for online learning (Landa *et al.*, 2021), financial limitations, and implementation of austerity measures, sluggish internet connectivity, and insufficient training (Stanistreet *et al.*, 2021), as a result of the deficiencies and susceptibilities within the system. Irrespective of the level of preparedness, this research discovered the significance of technical resources in all higher institutions and the required training for staff and students in utilizing technology platforms, which is highly important (Naidoo and Cartwright, 2022). The abrupt transition to remote learning posed many difficulties for students and faculty members in higher education establishments due to limited access to resources, inadequate training, and insufficient availability of online materials. Additionally, assessing and evaluating student performance was further complicated (Omodan *et al.*, 2021; Otu *et al.*, 2023; Aborode *et al.*, 2020).

4.2 The implications of the unforeseen pandemics on the educational systems

Atwoli *et al.* (2013) affirmed that the presence of the pandemic in the South African population (including higher education institutions) poses an additional challenge to a society that has already experienced multiple instances of collective trauma.

This study examines various literary works that suggest significant consequences of unexpected pandemics on educational systems. The findings have been clearly described in Table 3.

Table 3. Findings of the implications of the unforeseen pandemics on the educational systems

S/n	Reference	Description and Discussion
1	Mbandlwa, 2021	The unanticipated outbreaks of pandemics have considerable ramifications for the educational system. The transition from traditional in-person instruction to remote learning has further exacerbated pre-existing disparities in education, particularly among marginalized populations. The ongoing epidemic has the potential to result in substantial learning deficits that may persist beyond the current generation, jeopardizing the gains made over

		<p>several decades. Furthermore, the ongoing epidemic is anticipated to have substantial economic repercussions, potentially leading to a significant increase of 23.8 million children and youngsters who may either discontinue their education or face limited opportunities to attend school. The migration to online learning has additionally posed challenges in terms of technical connectivity, particularly in rural regions, hence eliciting apprehensions regarding the caliber of online education. The limited interaction between students and teachers has frequently resulted in diminished enthusiasm among students regarding the academic rigor of their studies.</p> <p>Moreover, the closing of educational institutions hinders the provision of essential services to children and communities, such as access to nutritious food, employment opportunities for numerous parents, and an elevated risk of abuse targeting women and children. Nevertheless, the global health crisis has expedited the digitalization of education, leading to the emergence of novel e-learning technologies and the widespread use of diverse e-learning systems, facilitating communication between educators and learners. This transition can enhance the caliber of instruction and the characteristics of pupils generated by the educational system.</p>
2	Mahaye, 2020	<p>The global health crisis triggered extended school closures, leading to the loss of valuable instructional time and significant disruption to educational curricula. This situation's potential consequences encompass transient and enduring harm to the educational system. Temporary damage includes the adverse effects on the academic curriculum, which may require a substantial duration to restore to its previous state. Conversely, permanent damage refers to the potential outcome where certain students may opt not to resume their education even after the conclusion of the pandemic.</p> <p>Furthermore, it is estimated that the ongoing epidemic may result in a potential loss of around 14% of the yearly school curriculum coverage. During instances of disruption, it may be imperative to employ alternative pedagogical approaches, such as blended</p>

		learning, to maintain uninterrupted access to educational opportunities.
3	Mbhiza, 2021	The COVID-19 epidemic necessitated the extensive shutdown of educational institutions, resulting in a transition from conventional in-person instruction to distant online pedagogy. The phenomenon has led to a fundamental change in the field of education, wherein novel perspectives, epistemologies, and pedagogical methods have emerged, departing from conventional practices. The COVID-19 epidemic has brought attention to the imperative for universities and institutions to provide training for their instructors and reassess their staffing needs to optimize the efficacy of online educational delivery. Moreover, there has been a strong emphasis on the need to reconsider pedagogical approaches and the underlying principles of lifelong learning to guarantee the delivery of high-quality and fair education to students from diverse social and economic contexts. The higher education sector has also embraced several instruments associated with the Fourth Industrial Revolution due to the transition to online learning.
4	Plessis <i>et al.</i> , 2022	The COVID-19 epidemic has brought to light the inherent weaknesses and disparities within the existing system, specifically on the accessibility of technology and the socio-economic conditions of pupils. Certain educational institutions have successfully shifted to online instruction, whilst others encounter significant challenges stemming from students' limited access to technology and socioeconomic circumstances. The pandemics have also brought attention to the systemic imbalances within higher education institutions, prompting demand for the supply of digital learning instruments to students. Moreover, the occurrence of pandemics gives rise to a condition characterized by ambiguity and uncertainty, prompting inquiries on the viability of preserving the school year and the potential for widespread contagion.

5	Armoed, 2021	<p>The outbreak of the pandemic prompted a rapid adjustment to novel circumstances, wherein faculty and students promptly engaged in distant instruction and learning, supplemented by technological advancements. This phenomenon has brought attention to pre-existing disparities within the system in regions characterized by economic, socio-economic, and technical obstacles. The COVID-19 epidemic has expedited the process of integrating digital technologies into educational methods, potentially resulting in the emergence of hybrid educational institutions that provide adaptable options for both students and instructors. Nevertheless, this transition has also posed difficulties in executing online instructional and educational approaches. The ongoing epidemic has significantly impacted the academic calendar, resulting in the cancellation or postponement of several academic events such as graduations, classes, tests, and research programs.</p>
6	Tadesse and Muluye, 2020	<p>The global pandemic temporarily ceased educational establishments, impacting students, educators, and caregivers worldwide. School closures have significantly influenced a substantial number of pupils, totaling over 1.5 billion, across 195 nations. Pandemics have a notable impact on several educational aspects, such as examinations, assessments, and the commencement of new academic semesters, potentially resulting in an extension of the school year. Distance learning and teacher training limitations in low-income nations exacerbate social inequality within schools, negatively affecting their education systems. Nevertheless, these obstacles also serve as catalysts for educational institutions to undergo systemic transformations, necessitating the development of novel curricula and teaching-learning methodologies tailored to post-pandemic circumstances.</p>
7	Mhlanga, 2021	<p>The global pandemic necessitated a transition from conventional in-person instructional sessions to remote online learning, revealing the susceptibilities inherent in the worldwide education industry. The abovementioned transition requires implementing adaptable</p>

		<p>and robust educational institutions to manage forthcoming uncertainties effectively. Nevertheless, this transformation has also brought several obstacles to the forefront, including limitations in resources, preparedness of staff members, accessibility for students, and levels of enthusiasm. In several instances, students residing in rural regions or facing socio-economic disadvantages have encountered exclusion due to limited internet connectivity and the absence of learning management systems. Notwithstanding these obstacles, the COVID-19 pandemic has expedited the digitalisation process within the education industry, leading to a heightened utilization of Fourth Industrial Revolution (4IR) technologies for remote instruction. This transition offers the potential for enhancing accessibility, cost-effectiveness, and efficiency within the education industry.</p>
8	Alex, 2022	<p>The global pandemic necessitated the closure of educational institutions on a worldwide scale, resulting in the disruption of academic activities for more than 80% of the worldwide student populace. The transition from traditional in-person classes to online learning has presented various difficulties, including limited access to campus resources, the implementation of alternative evaluation strategies, adjustments in academic burden, and the utilization of alternative communication platforms. The pandemics have also had significant ramifications for the mental well-being of students. Moreover, many colleges, particularly those in rural regions, lack the adequate infrastructure and resources to support online instructional methods. The lack of preparedness for self-regulated learning has rendered online learning useless for numerous pupils. Hence, pandemics have compelled scholars to develop policies and strategies for online instruction and learning to mitigate the long-term impact of pandemics on education.</p>
9	Cranfield <i>et al.</i> , 2021	<p>Conventional higher education institutions were compelled to transition from a primarily in-person instructional approach to a completely online modality, thereby initiating a period</p>

		<p>characterized by the emergence of "emergency eLearning". The profound modification of fundamental teaching and evaluation procedures not only brought about a transformation in the higher education domain but also had a significant influence on the experiences of students in terms of learning. The implementation of emergency eLearning education during the pandemic has been observed to enhance specific students' autonomous learning capabilities and digital literacy. Nevertheless, it is worth noting that the influence of this phenomenon shows considerable variation across students hailing from diverse nations, implying that cultural elements might exert a significant impact. The epidemic has also required modern educational technology tools, resulting in a transformative shift in pedagogical practices.</p>
10	Aristovnik <i>et al.</i> , 2020	<p>The epidemic necessitated the shutdown of educational institutions, resulting in a transition to online lectures and tutorials, altering communication routes, and implementing novel assessment systems. The abovementioned circumstances have impacted students' academic endeavors, interpersonal relationships, individual monetary circumstances, and psychological well-being. The occurrence of pandemics has also led to alterations in the behaviors and mindsets of students, including an increased focus on personal hygiene and health. Moreover, the resumption of educational establishments after the pandemic would undergo significant alterations, necessitating the reevaluation of established standards within the post-pandemic milieu. Consequently, these changes are anticipated to impact the future of workforce education profoundly.</p>
11	Stanistreet <i>et al.</i> , 2021	<p>The transition to online delivery in higher education significantly impacted students' learning experiences worldwide, with unique implications observed in South Africa. While several educational institutions have demonstrated innovative responses to ensure uninterrupted learning, many have faced challenges due to insufficient financial, technological, and pedagogical resources,</p>

		<p>hindering their ability to serve learners appropriately throughout the lockdown period. The pandemics have further intensified pre-existing socio-economic disparities, disproportionately impacting marginalized and economically disadvantaged groups. Moreover, pandemics have brought attention to the necessity of equitable, democratic, and student-focused educational resources. It has also emphasized prioritizing students in forthcoming policy interventions and research endeavors.</p>
12	<p>Olawale <i>et al.</i>, 2021</p>	<p>The implementation of online teaching and learning methods has resulted in an amplified workload for educational institutions, resulting in feelings of tiredness, fatigue, and financial limitations. The ongoing global epidemic has engendered significant psychological distress stemming from the pervasive ambiguity around future outcomes, the demands associated with remote learning, and the difficulties encountered in effectively managing one's time. The psychological obstacles experienced at higher education institutions have a significant influence on productivity, leading to heightened levels of stress, anxiety, depression, and social isolation. As a result, as mentioned above, these issues frequently result in elevated rates of absenteeism, diminished levels of job engagement, and decreased performance among students and staff members.</p>
13	<p>Adefuye <i>et al.</i>, 2021</p>	<p>The global health crisis necessitated a shift towards remote online education, characterized by implementing open-book assessment methods, integrating online pre-clerkship curricula, and utilising simulations and virtual learning platforms. Nevertheless, the alterations also pose specific difficulties, specifically for students from economically disadvantaged families who may encounter obstacles in acquiring gadgets, data, and internet connectivity. Moreover, the preexisting financial challenges, coupled with the adverse effects of the pandemic on global economies, have exerted significant pressure on allocating resources for e-learning initiatives. Notwithstanding these obstacles, the ongoing pandemic</p>

		has also provided avenues for improving the methods and outcomes of teaching and learning. This is evident via governmental bodies' adoption of technology-driven pedagogical approaches and the integration of e-learning platforms within educational institutions, which have experienced a notable spike.
14	Mhlanga <i>et al.</i> , 2022	Integrating environment and health learning modules in the curriculum, reinforcing environmental regulations and hygiene practices, and incorporating virtual mental health and medical services were deemed necessary in response to the pandemic. Additionally, modules must be migrated to harmonize curriculum capacities and an increasing emphasis on academic staff training for online teaching. Moreover, pandemics have precipitated a swift transition towards online education, leading to many obstacles encompassing cost-effectiveness, internet access, evaluation methodologies, and providing enough student assistance. Finally, the transition to online learning has an impact on academic personnel.
15	Patrick <i>et al.</i> , 2021	The emergence of the Internet brought about a need for a significant shift in the educational domain, prompting institutions to modify their curriculum materials and instructional approaches. As a result, there has been a transition towards online instructional methods, supplanting conventional in-person delivery options. Nevertheless, this transformation presents challenges when examining the socioeconomic landscape, specifically in regions like South Africa. Moreover, it is crucial to design and implement regulatory measures and frameworks that promote the efficient application of Internet technology. Furthermore, pandemics can induce a cessation of educational endeavors, leading to the nonattendance of students in educational institutions and posing challenges for these establishments in adhering to their academic timetables.

16	Dison <i>et al.</i> , 2022	The COVID-19 epidemic presented significant obstacles for higher education institutions, necessitating a rapid shift for faculty and students towards an unfamiliar emergency remote teaching and learning (ERTL) format. The abrupt transition has prompted a reassessment of the objectives of courses and higher education in a more comprehensive manner. The underlying circumstances have also incited a critical examination of the metrics used to gauge achievement in courses that underwent significant changes. The experiences and acquired knowledge during this period will have a lasting impact on the delivery and facilitation of education at other times.
17	Naidoo and Cartwright, 2022	The outbreak of the COVID-19 pandemic resulted in significant disruptions to traditional teaching and learning techniques, necessitating a transition towards virtual modalities. Nevertheless, there have been expressed concerns over the pertinence and student-centric nature of these virtual methodologies, particularly for students who come from underprivileged backgrounds characterized by poverty. The pandemics have had an impact on various aspects of student life, including academic functioning, mental health, and psycho-social well-being. As a result, there has been a noticeable rise in the need for Student Counselling Services. Moreover, the occurrence of pandemics has resulted in the need for the integration of technology-driven mental health assistance within the realm of higher education.
18	Mahlaba, 2020	The advent of the coronavirus pandemic necessitated a transition from conventional face-to-face instruction in physical lecture halls to virtual internet platforms, significantly altering the landscape of educational practices. The current shift has brought attention to the significance of technical advancements in the 21st century, particularly the utilization of online technology as a vital means of preserving educational activities during pandemics. Nevertheless, the sudden shift to remote learning has brought to light several concerns, including the potential compromise of the caliber of

		<p>university graduates and the occurrence of students collaborating on online assessments. Moreover, students have been entrusted with greater accountability for their educational pursuits, a departure from the norm that has elicited surprise among many individuals.</p>
19	Landa <i>et al.</i> , 2021	<p>The occurrence of the disease outbreak had a profound impact on the trajectory of teaching and learning, significantly influencing students' academic achievement. Pandemics have highlighted disparities among nations, governmental procedure deficiencies, and institutional structure vulnerabilities. The authors have also emphasized the dearth of digital literacy and challenges in data accessibility, both of which are essential factors for the successful implementation of remote learning. Nevertheless, online learning platforms offer a potential avenue for expanding access to higher education, particularly for colleges that have hitherto struggled to meet student demand due to constraints in their physical facilities. The effective shift from conventional to virtual classrooms necessitates prompt intervention and capacity-building activities to train educators and students.</p>
20	Adelowotan, 2021	<p>The global pandemic resulted in the cancellation of academic years in certain nations, negatively impacting education and knowledge acquisition. Nevertheless, there has been a notable increase in the utilization and incorporation of information and communication technology (ICT) alongside many new tools in the educational setting. These tools include simulation-based training, virtual reality, augmented reality, flipped classrooms, teleconferencing, and social media-based platforms. These tools have been utilized to create online courses and facilitate adaptability in instructional and educational approaches. Notwithstanding these developments, the issue of limited access to education and resources, such as laboratory techniques and simulation-based training facilities, persists, particularly in undeveloped and developing nations.</p>

Table 3 shows some of the effects of the COVID-19 pandemic on South African higher education systems. The limited interaction between students and teachers due to the emergency transition from contact to e-learning has diminished enthusiasm among students regarding the academic rigor of their studies. Moreover, the closing of educational institutions hinders the provision of essential services to students, such as employment opportunities for numerous students/parents, and an elevated risk of abuse targeting women and children (Mbandlwa, 2021). The extended school closures have led to the loss of valuable instructional time and significant disruption to educational curricula. Permanent damage resulted in certain students opting not to resume their education even after the conclusion of the pandemic (Mahaye, 2020; Mbhiza, 2021; Plessis *et al.*, 2022). The transition has also posed difficulties in executing online instructional and educational approaches. The epidemic has significantly impacted the academic calendar, resulting in the cancellation or postponement of several academic events, such as graduations, classes, tests, and research programs (Armoed, 2021; Tadesse and Muluye, 2020).

The COVID-19 pandemic has sped up digitalization within the education industry, leading to a heightened utilization of Fourth Industrial Revolution (4IR) technologies for remote instruction. This transition can enhance accessibility, cost-effectiveness and efficiency within the education industry (Mhlanga, 2021). The transition from traditional in-person classes to online learning has presented various difficulties, including limited access to campus resources, the implementation of alternative evaluation strategies, adjustments in academic burden, and the utilization of alternative communication platforms. The pandemics have also had significant ramifications for the mental well-being of students (Alex, 2022). The COVID-19 pandemic has impacted students' academic endeavors, interpersonal relationships, individual monetary circumstances, and psychological well-being. The occurrence of pandemics has also led to alterations in the behaviors and mindsets of students, including an increased focus on personal hygiene and health (Aristovnik *et al.*, 2020). The pandemics have further intensified pre-existing socio-economic disparities, disproportionately impacting marginalized and economically disadvantaged groups.

Moreover, pandemics have brought attention to the necessity of equitable, democratic, and student-focused educational resources (Stanistreet *et al.*, 2021). The psychological obstacles experienced at higher education institutions have a significant influence on productivity, leading to heightened levels of stress, anxiety, depression, and social isolation

(Olawale *et al.*, 2021). The COVID-19 pandemic poses certain difficulties, specifically for students from economically disadvantaged families who may encounter obstacles in acquiring gadgets, data, and internet connectivity. Moreover, the preexisting financial challenges, coupled with the adverse effects of the pandemic on global economies, have exerted significant pressure on allocating resources for e-learning initiatives (Adefuye *et al.*, 2021).

Nevertheless, the COVID-19 pandemic has expedited the integration of digital technologies into educational methods, potentially resulting in hybrid educational institutions that provide adaptable options for both students and instructors (Armoed, 2021). The profound modification of fundamental teaching and evaluation procedures not only brought about a transformation in the higher education domain but also had a significant influence on the experiences of students in terms of learning. Implementing emergency eLearning education during the pandemic has been observed to enhance certain students' autonomous learning capabilities and digital literacy. The pandemic has also required modern educational technology tools, resulting in a transformative shift in pedagogical practices (Cranfield *et al.*, 2021). The COVID-19 pandemic altered communication routes and helped implement novel assessment systems (Aristovnik *et al.*, 2020). The pandemic has also provided avenues for improving the methods and outcomes of teaching and learning. This is evident via governmental bodies' adoption of technology-driven pedagogical approaches and the integration of e-learning platforms within educational institutions, which have experienced a notable spike (Adefuye *et al.*, 2021). In response to the pandemic, integrating environment and health learning modules in the curriculum, reinforcing environmental regulations and hygiene practices, and incorporating virtual mental health and medical services were deemed necessary (Mhlanga *et al.*, 2022).

4.3 Results of the Psychological effects of COVID-19 on the students

The COVID-19 pandemic worsened the pre-existing mental health disorders due to the trauma experienced (Montemurro, 2020). In a country characterized by significant economic disparities, a considerable proportion of the South African population is below the poverty threshold and in densely populated households that often consist of multiple generations. The prevalence of depression, anxiety, gender-based violence, and child abuse and neglect exhibit a significant level of occurrence. Despite the abolition of apartheid-era laws, there remains a persistent and profound presence of structural and cognitive racism

(Durrheim, Mtose, & Brown, 2011). Like other regions globally, mental health professionals in this context might anticipate a rise in the prevalence of post-traumatic stress disorder (PTSD), mood disorders, anxiety disorders, phobias, and obsessive-compulsive disorders (Banerjee, 2020; Torales, O'Higgins, Castaldelli-Maia, & Ventriglio, 2020).

A comprehensive examination of the available literature reveals substantial evidence regarding the profound psychological repercussions of COVID-19 on pupils, which subsequently exerted both direct and indirect influences on educational systems. The findings have been succinctly described in Table 4.

Table 4. Findings of the Psychological Effects of COVID-19 on the students

S/n	Reference	Description and Discussion
1	Stanistreet <i>et al.</i> , 2021	The impact of COVID-19 on students encompasses notable psychological consequences, mostly stemming from the substantial disruption of learning caused by the closing of educational institutions and the subsequent transition to online instructional modalities. The circumstance mentioned above has significantly affected students, particularly those residing in economically disadvantaged and marginalized neighborhoods. Moreover, it is noteworthy that marginalized adolescents have been disproportionately impacted, as they have witnessed a surge in the prevalence of traumatic stress, inadequate access to stable housing and nourishment, and instances of domestic violence.
2	Omodan <i>et al.</i> , 2021	The impact of COVID-19 on students encompasses notable psychological consequences, mostly stemming from the extensive disruption of learning caused by the closing of educational institutions and the subsequent transition to online instructional modalities. The circumstance above has profoundly affected students, particularly those residing in economically disadvantaged and marginalized neighborhoods. Moreover, it is worth noting that marginalized young individuals have been disproportionately impacted, as they have encountered escalating levels of traumatic stress, instability in terms of housing and access to food, and instances of domestic violence.
3	Mhlanga <i>et al.</i> , 2022	The outbreak of the pandemic has had a significant impact on the field of education, leading to a disruption in the traditional methods of teaching and learning. As a result, almost two-thirds of higher education institutions have resorted to replacing face-to-face educational practices with distant education alternatives. The

		<p>transition has posed difficulties accessing technical infrastructure, capabilities, and pedagogical approaches. Nevertheless, technology has also presented prospects for more flexibility in education, the investigation of integrated learning approaches, and a combination of real-time and self-paced learning. The global health crisis has also impacted the movement of international students and has required the implementation of new protocols for performing evaluations. Moreover, the impact of this phenomenon extends to community engagement endeavors, as certain institutions have observed a rise in such activities while others have experienced a decline.</p>
4	Naidoo and Cartwright, 2022	<p>The impact of the coronavirus outbreak on students encompasses several psychological consequences, including the amplification of pre-existing mental health disorders and the manifestation of behavioral, cognitive, and emotional alterations, such as heightened health-related fears and concerns. The pandemic has elicited significant trauma and anxiety among individuals, primarily because of its sudden emergence, unprecedented characteristics, and potential for catastrophic outcomes. Additionally, it has resulted in individual and tangible detriments due to significant socio-economic upheavals. There has been a growing trend among students to actively seek assistance for various challenges, such as trauma, loss, grief, disruptions in social support networks, financial strain, and inadequate access to food. The ongoing epidemic has resulted in significant disruptions to academic endeavors, primarily stemming from instances of personal or familial illness and mortality.</p>
5	Mahlaba, 2020	<p>The epidemic has had adverse effects on pupils, leading to heightened levels of post-traumatic stress disorder, anxiety, and despair. The impact of school closures can be further intensified, particularly for pupils who already have mental illnesses, as they face a reduced availability of support resources typically accessible within educational institutions. Extended periods of isolation can also result in feelings of ennui and an excessive preoccupation with social media, thereby exacerbating mental health issues. The dissemination of inaccurate information regarding the pandemic through social media platforms can potentially contribute to the exacerbation of public anxiety.</p>
6	Landa <i>et al.</i> , 2021	<p>The students were impacted by the COVID-19 epidemic, resulting in heightened psychological distress caused by prolonged confinement in suboptimal physical settings, challenges in managing the demands of both home life and academic/work</p>

		responsibilities, and heightened concern around the risk of contracting the virus. The pandemic's inherent ambiguity and subtle manifestation elicited adverse emotional reactions.
7	Mncube <i>et al.</i> , 2021	The significant stress experienced by students is attributed to the various disturbances in their lives and the anxieties around their well-being and that of their families. The presence of stress can have detrimental effects on both the academic performance and psychological well-being of individuals. The abrupt transition to remote education and the implementation of social distancing protocols have further contributed to this heightened state of anxiety. Moreover, the global pandemic has engendered a sense of unpredictability and unease over individuals' prospective professional trajectories, particularly among those near completing their academic studies. It is recommended that universities offer mental health assistance and stress management measures throughout the current period.
8	Otu <i>et al.</i> , 2023	Individuals have reported heightened worry, dread, and bewilderment, explicitly concerning their academic advancement and the transition to remote learning. The intensity of these emotions was heightened by socioeconomic variables, including limited access to high-speed Internet, densely populated living conditions, and a scarcity of technologically advanced devices. The epidemic has also influenced the emotional well-being of pupils, leading to heightened levels of stress and worry as a result of the economic and social circumstances they have encountered during this crisis. The transition to remote learning has also impacted students' physical and psychological exertion towards their academic responsibilities.
9	Gumede and Badriparsad, 2022	The transition from traditional face-to-face instruction to online teaching and learning has been associated with many emotional and psychological challenges, including heightened levels of anxiety, a diminished sense of purpose, and a feeling of being overwhelmed. The academic achievement of individuals has been adversely affected by the epidemic as a result of the existence of a digital gap. Concerns regarding their future, including graduation and the fulfilment of their responsibilities, were also mentioned by students.
10	Motala and Menon, 2020	The experience of distress arising from isolation, the practice of physical and social separation, and the absence of interpersonal interaction. The transition to digital learning environments has also prompted inquiries on the influence on students' interpersonal connections and academic progress. Furthermore, the ongoing

		epidemic has significantly disturbed conventional academic procedures, hence exacerbating the levels of stress experienced by individuals. In response to these issues, universities have been compelled to incorporate psychological support and counseling services to assist students in managing their well-being.
11	Mbandlwa, 2021	The diminished level of student-teacher interaction has resulted in a decline in students' enthusiasm for the integrity of their academic pursuits. The sudden transition from in-person instruction to remote learning has prompted students to resort to incomplete homework submissions, seek assistance from their classmates, or refrain from completing assignments altogether, as the perceived importance of acquiring knowledge has diminished in light of the COVID-19 pandemic. The ongoing epidemic has further exacerbated pre-existing disparities in education, posing a significant risk of undoing decades of advancements, particularly in ensuring equitable access to and retention of education for girls and young women. The disruption of education has also heightened the vulnerability of women and children to instances of abuse.
12	Plessis <i>et al.</i> , 2022	The heightened stress levels arise from various difficulties, including the struggle to locate a suitable and tranquil environment for studying within the confines of one's residence, effectively balancing time between academic pursuits and familial responsibilities, and the problems associated with technology and internet connectivity. Furthermore, the transition to an online learning environment has transformed interpersonal dynamics, whereby certain students encounter challenges in effectively navigating and resolving conflicts within this context.
13	Tadesse and Muluye, 2020	Elevated levels of tension, dread, and anxiety are commonly observed, including apprehension around mortality or the potential demise of loved ones. Stress can impact students' overall well-being, both in terms of their mental and physical health. The ongoing pandemic has the potential to significantly impact the career trajectories of students, particularly those pursuing higher education. Moreover, it is essential to note that not all students may experience positive engagement with online learning tools and platforms, hence potentially exacerbating their levels of stress and anxiety.
14	Mhlanga, 2021	The transition from in-person instruction to online learning, along with the implementation of hygiene protocols and restricting measures, has resulted in feelings of anxiety, irritation, and boredom among individuals. The students also expressed

		apprehension regarding their prospective job trajectories and academic pursuits. The COVID-19 pandemic disproportionately affected the emotional well-being of female full-time students, particularly those at the introductory level. During the pandemic, students who had socio-demographic attributes such as part-time enrollment, first-level academic standing, lower socioeconomic status, and African or Asian origin expressed dissatisfaction with their educational experiences.
15	Alex, 2022	The experiences of individuals include emotions such as frustration, a sense of hopelessness, and apprehension about what lies ahead. The global pandemic has resulted in considerable psychological strain, as seen by students expressing anxiety regarding their educational achievements in light of the transition to remote education and the difficulties associated with studying in a domestic environment, including limited seclusion and auditory disturbances.
16	Aristovnik <i>et al.</i> , 2020	The findings indicate a notable rise in the prevalence of adverse affective states, including but not limited to boredom (45.2%), anxiety (39.8%), frustration (39.1%), anger (25.9%), hopelessness (18.8%), and shame (10.0%). The feelings mentioned above were shaped by the ramifications of the epidemic on individuals' everyday routines, the economic consequences that ensued, and the disruptions experienced in academic pursuits. The epidemic has resulted in distinct short- and long-term effects on students' educational attainment and psychological well-being. Students' primary areas of concern revolved around their prospective job trajectories and academic challenges. The global pandemic has also altered students' everyday routines and social interactions, further influencing their mental well-being.

The impact of COVID-19 on students encompasses notable psychological consequences. Marginalized adolescents have been disproportionately impacted, as they have witnessed a surge in the prevalence of traumatic stress, inadequate access to stable housing and nourishment, and instances of domestic violence (Stanistreet *et al.*, 2021). Marginalized young individuals have encountered escalating levels of traumatic stress, instability in terms of housing and access to food, and instances of domestic violence (Omodan *et al.*, 2021). The impact of the coronavirus outbreak on students encompasses several psychological consequences, including the amplification of pre-existing mental health disorders and the manifestation of behavioral, cognitive, and emotional alterations, such as

heightened health-related fears and concerns. The pandemic has elicited significant trauma and anxiety among individuals, primarily because of its sudden emergence, unprecedented characteristics, and potential for catastrophic outcomes (Naidoo and Cartwright, 2022). The epidemic has had adverse effects, particularly for students who already have mental illnesses, as they face a reduced availability of support resources typically accessible within educational institutions. Extended periods of isolation can also result in feelings of ennui and an excessive preoccupation with social media, thereby exacerbating mental health issues (Mahlaba, 2020).

The prolonged confinement in suboptimal physical settings, challenges in managing the demands of both home life and academic/work responsibilities, and heightened concern around the risk of contracting the virus. The pandemic's inherent ambiguity and subtle manifestation elicited adverse emotional reactions in South African higher education students (Landa *et al.*, 2021). Moreover, the global pandemic has engendered a sense of unpredictability and unease over individuals' prospective professional trajectories, particularly among those close to completing their academic studies (Mncube *et al.*, 2021). The epidemic has also influenced the emotional well-being of students, leading to heightened stress and worry due to the economic and social circumstances they encountered during this crisis (Otu *et al.*, 2023). Concerns regarding their future, including graduation and the fulfillment of their responsibilities, also contributed to students' psychological trauma (Gumede and Badriparsad, 2022). Furthermore, the epidemic has significantly disturbed conventional academic procedures, hence exacerbating the levels of stress experienced by individuals, leading to distress arising from isolation, the practice of physical and social separation, and the absence of interpersonal interaction (Motala and Menon, 2020).

4.4 Preparedness for Future Possible Occurrences

Mhlanga *et al.* (2022) observed that the COVID-19 pandemic has led the South African education sector to transform from the conventional learning method to the e-learning revolution. The necessity of social distancing and lockdowns during the pandemic led to the education sector embracing the various 4IR (fourth industrial revolution) tools to ensure the continuity of learning, thereby making e-learning a reality.

Numerous literary works have proposed strategies for proactively addressing potential outbreaks of COVID-19, intending to mitigate or eliminate any detrimental impacts on

students and the educational system. The claims put forth by the authors are concisely presented in Table 5.

Table 5. Findings on ways to prepare for future possible occurrences

S/n	Reference	Description and Discussion
1	Stanistreet <i>et al.</i> , 2021	It is imperative to enhance the equity, resource allocation, and resilience of education systems to mitigate the occurrence of future pandemics. This encompasses examining access, preparation, and technology integration concerns alongside evaluating the influence of leadership and institutional change management.
2	Adefuye <i>et al.</i> , 2021	<p>Potential strategies to prevent future pandemics in higher education encompass adopting a comprehensive and empirically grounded approach to guide decision-making on investments in e-learning infrastructure.</p> <p>- Promoting the ongoing professional development of educators in the realm of technology-integrated instruction.</p> <p>The objective is to create adaptable platforms that facilitate student connectivity and contribute to their academic achievements.</p> <p>- Ensuring equitable access to new technologies for all learners.</p> <p>The tasks involved in this endeavor include composing grant submissions, actively seeking contributions, and establishing collaborative relationships to secure financial support.</p> <p>The proposal replaces face-to-face clinical assessments with open-book and digitally proctored shelf exams.</p>
3	Mhlanga <i>et al.</i> , 2022	The study proposes the integration of environment and health learning modules into the curriculum, the enhancement of environmental policies and hygiene practices, the inclusion of virtual mental health and medical services, the migration of modules, and the reinforcement of research endeavors. Additional strategies encompass facilitating access to digital resources and tackling issues related to cost, internet connectivity, evaluation, and student assistance.
4	Patrick <i>et al.</i> , 2021	Implementing policies and frameworks aimed at optimizing online systems, incorporating local teaching and learning methods, and resolving internet accessibility concerns are among the

		preparedness and mitigation measures employed in tertiary education to prevent the potential recurrence of a pandemic.
5	Dison <i>et al.</i> , 2022	Various measures have been implemented to address the challenges posed by the shift to online education, including the use of virtual instructional methods, the recording of lectures for asynchronous access, efforts to address issues of equity and inequality, and the promotion of an ethical framework centered around caring. Additional indicators encompass adapting courses for online delivery, facilitating academic research output, and assessing the influence of higher education on students' livelihoods.
6	Naidoo and Cartwright, 2020	The use of technology-driven mental health support services aims to address the underlying psycho-social and socio-economic imbalances while also meeting the growing need for consistent student counselling services.
7	Mahlaba, 2020	This approach advocates for the cultivation of self-directed learning skills, offers practical recommendations for remote teaching, and aims to prevent students from developing a long-term reliance on teachers for their educational progress. Moreover, establishing explicit protocols for implementing social distancing measures and effectively handling the closure of educational institutions is paramount in mitigating the transmission of a widespread disease outbreak.
8	Landa <i>et al.</i> , 2021	It was disseminating knowledge about COVID-19, enacting measures to enforce social distance and hygiene regulations, and extending assistance to students necessitating departure from school. Furthermore, it is imperative to promptly implement measures that promote the adoption of online education and enhance digital proficiency, particularly among students residing in remote regions. The government must allocate resources to higher education institutions to facilitate this transition and guarantee continued access to education after the COVID-19 pandemic.
9	Adelowotan, 2021	The report posits that institutions ought to prioritize innovation and leverage emerging technology to address the problems presented by the COVID-19 epidemic. The strategies above encompass simulation-based training, virtual and augmented reality, flipped classrooms, teleconferencing, and social media platforms. Furthermore, online courses have been developed to tackle the challenge posed by the emergence of respiratory viruses. It is advisable to reconsider using instructional materials and

		technologies to enhance the adaptability of teaching and learning approaches.
10	Mncube <i>et al.</i> , 2021	They are enhancing the communication infrastructure, facilitating access to online resources such as data, computers, and modems for students and staff, and transitioning from conventional examinations to online assessment methods. Additional strategies encompass enhancing virtual mobility and fostering collaborative online learning, furnishing staff and students with personal protective equipment (PPE), and significantly emphasising mental health care. It is imperative to prioritize establishing transparent and empathetic communication channels with all relevant parties involved while simultaneously granting educators professional independence.
11	Otu <i>et al.</i> , 2023	<p>Preventive and mitigative strategies aimed at averting any future pandemics in higher education encompass robust debates and deliberations to evaluate the ramifications of the COVID-19 pandemic on students, faculty, and educational institutions.</p> <ul style="list-style-type: none"> - Implementing ongoing training programs for staff and students to enhance their proficiency in cybersecurity. - The establishment of virtual communities to facilitate educational interactions and knowledge sharing. - Endeavors to mitigate the exacerbation of inequalities resulting from the COVID-19 pandemic. <p>The COVID-19 epidemic</p> <ul style="list-style-type: none"> - Promptly initiating efforts to enhance the facilitation of teaching and learning via diverse online platforms - Implementing measures to minimize the transmission of the disease, such as the enforcement of restrictions on public and social gatherings - Exploring innovative approaches to managing departments or institutions - Tackling students' psychological stressors and challenges through resilience studies and establishing support systems.

12	Gumede and Badriparsad, 2021	<p>The authors suggested ensuring regular and effective communication with students, offering comprehensive assistance, facilitating skills development for instructors and students, and establishing sustainable teaching management practices.</p> <p>Furthermore, it is imperative to prioritize efforts towards mitigating the digital divide and guaranteeing equitable access to essential resources required for online education.</p>
13	Motala and Menon, 2020	<p>The advancement of knowledge, scientific discoveries, technological innovations, and strategies for economic production. Evaluating and monitoring higher education's responses to lockdowns, particularly regarding remote teaching and learning, necessitates a critical approach. Institutions should also anticipate and make provisions for a paradigm shift in which teaching and learning activities are conducted exclusively through online platforms. This encompasses the strategic preparation for potential interruptions to various academic activities, such as assessment procedures, laboratory experiments, practical sessions, and data gathering for research purposes. In addition to anticipating psychosocial challenges arising from isolation and physical distancing, institutions must make provisions for psychological assistance and counselling services. Finally, it is imperative for institutions to proactively tackle the social justice and exclusion concerns that have been brought to the forefront throughout the ongoing pandemic.</p>
14	Mbandlwa, 2021	<p>One effective strategy is the implementation of e-learning or online learning platforms to prevent the potential recurrence of a pandemic in tertiary education. These systems allow students to conveniently access course material and content anywhere and anytime. This includes utilising instructional technology, the Internet, and digital resources, such as learning management systems, software applications, and social media platforms. Furthermore, an essential measure is the creation of novel e-learning tools that facilitate educators in fostering evaluation and enable learners to engage in lectures actively. Moreover, using e-learning resources within the realm of higher education guarantees a heightened capacity for knowledge analysis and an enhanced standard of pedagogy.</p>
15	Mahaye, 2020	<p>The implementation of social distancing measures, the adoption of alternative teaching methods such as blended learning, the provision of online and distance learning resources, and the gradual reintroduction of in-person schooling are some strategies being employed. The procedures above are designed to mitigate the pandemic's adverse effects on education and guarantee that students</p>

		can engage in educational pursuits during and after the lockdown period.
16	Mbhiza, 2021	Implementing online learning on a broad scale as a substitute for delivering curriculum, reconsidering and reorganising assessment approaches, and training instructors for online instruction. Furthermore, educational leaders must reassess the process of generating and disseminating instructional materials while establishing collaborative communities to address the challenges posed by the evolving educational landscape effectively. The education industry should be adequately equipped to sustain its operations in virtual environments.
17	Plessis <i>et al.</i> , 2021	<p>One of the strategies employed to prevent the potential future outbreak of a pandemic in tertiary education institutions is the implementation of preparedness and mitigation measures. These measures encompass disseminating information regarding hygiene protocols and social distancing guidelines to faculty members and students.</p> <p>The implementation of a temporary halt on the utilization of biometric access control systems, coupled with the provision of hand sanitizers at all access points.</p> <ul style="list-style-type: none"> - The execution of contact tracing and establishment of communication channels with the families of affected students and staff members. - The pursuit of collaborative alliances with financial institutions to facilitate the provision of loans for students. - Implementing business continuity plans and allocating resources towards technological advancements and skill development for online learning. - Task forces of individuals with diverse skill sets are established, and centralized executive structures are created to facilitate coordinated decision-making processes. - The development of evidence-based tools and databases to facilitate screening, monitoring, and real-time updates on the ongoing pandemic.
18	Armoed, 2021	Measures aimed at preventing the potential recurrence of a pandemic within the realm of tertiary education encompass the implementation of social distancing protocols.

		<ul style="list-style-type: none"> - Demonstrating agility in adjusting to remote training methods in the context of technology-enhanced pedagogy - Formulating and implementing online instructional approaches for teaching and learning - Tackling socio-economic obstacles and concerns - Addressing disparities within the education system to promote equity - Facilitating the integration of digital technologies into pedagogical approaches - Taking into account the economic, socio-economic, and technological obstacles - The implementation of a hybrid education system - The examination of the impact of the pandemic in a post-COVID-19 era - The promotion of visible learning - The resolution of essential difficulties within the education system.
19	Tadesse and Muluye, 2020	<p>Mitigation measures aimed at addressing future pandemics in the context of higher education encompass the formulation of policies that effectively incentivize parents to facilitate the return of their children to educational institutions. Additionally, it involves the proactive preparation of teachers and students to readily adapt to diverse learning platforms and the provision of support to educational systems in developing nations. Additional steps encompass the formulation of plans to ensure the uninterrupted functioning of the education system via remote instruction, the expansion of educational technology, the implementation of zero-rating policies for educational resources on the Internet, the development of online teaching and learning materials, and the utilization of freely accessible online learning resources.</p> <p>Furthermore, educational institutions must develop curricula and formulate pedagogical approaches tailored to the unique challenges and circumstances that arise after a pandemic.</p>
20	Mhlanga, 2021	<p>The adoption of adaptable and robust educational systems, the assurance of staff preparedness and assurance, the enhancement of student accessibility and motivation, and the allocation of resources towards digital transformation and tools related to the Fourth Industrial Revolution. Nevertheless, it is imperative to tackle various obstacles, including but not limited to significant disparities</p>

		in wealth distribution, the divide in access to digital technologies, limitations in available resources, and shortages in necessary skills.
21	Alex, 2022	<ul style="list-style-type: none"> - Exploring pedagogical approaches for adapting to future emergencies in education - Facilitating student-instructor engagement through the implementation of instructional ideas and infrastructure - Developing policies and strategies for implementing online instructional methods and educational practices. - Collecting data on the educational experiences of students within the global epidemic. <p>The task involves creating and organising instructional resources to deliver online education.</p> <ul style="list-style-type: none"> - Enhancing the skill set of students and lecturers in the domain of online pedagogy - Engaging in collaborative efforts with peer institutions to acquire knowledge and insights on effective methodologies - Administering post-pandemic questionnaires to evaluate students' satisfaction levels and identify improvement areas.
22	Cranfield <i>et al.</i> , 2021	Several measures can be implemented to prevent the potential recurrence of a pandemic in tertiary education. These measures encompass understanding students' digital needs, effectively addressing the challenges posed by their home study environments, facilitating access to study spaces for individuals lacking home learning conditions, and ensuring engaging online study materials. Furthermore, it is imperative to provide avenues for cultivating digital, informational, and scholarly proficiencies at the onset of students' university trajectories to foster self-reliant learners.
23	Aristovnik <i>et al.</i> , 2020	Implementing proactive strategies ensures enough support for pupils and promotes their holistic development. Potential actions that could be implemented include emergency aid for marginalized groups, provision of childcare services for employees, postponement of student loan repayments, provision of financial support, and implementation of tax-related measures such as payment and filing deadlines. Additional steps could include housing, such as implementing rent freezes or deferring mortgage payments.

Table 5 shows different measures recommended to be put in place for the South African higher education sector against shocks in case of future occurrences. Enhancing education systems' equity, resource allocation, and resilience is imperative. This encompasses examining access, preparation, and technology integration concerns alongside evaluating the influence of leadership and institutional change management (Stanistreet *et al.*, 2021). Potential strategies to prevent future pandemics in higher education include adopting a comprehensive and empirically grounded approach to guide decision-making on investments in e-learning infrastructure (Adefuye *et al.*, 2021). Mhlanga *et al.* (2022) propose integrating environment and health learning modules into the curriculum, enhancing environmental policies and hygiene practices, including virtual mental health and medical services, migrating modules, and reinforcing research endeavors. Implementing policies and frameworks to optimise online systems, incorporating local teaching and learning methods, and resolving internet accessibility concerns are among the preparedness and mitigation measures (Patrick *et al.*, 2021).

Various measures have been implemented to address the challenges posed by the shift to online education, including the use of virtual instructional methods, the recording of lectures for asynchronous access, efforts to address issues of equity and inequality, and the promotion of an ethical framework centered around caring (Dison *et al.*, 2022). The use of technology-driven mental health support services aims to address the underlying psychosocial and socio-economic imbalances while also meeting the growing need for consistent student counseling services (Naidoo and Cartwright, 2020) is another measure. Moreover, establishing explicit protocols for implementing social distancing measures and effectively handling the closure of educational institutions is paramount in mitigating the transmission of a widespread disease outbreak (Mahlaba, 2020). Furthermore, it is imperative to promptly implement measures that promote the adoption of online education and enhance digital proficiency, particularly among students residing in remote regions (Landa *et al.*, 2021). The report posits that institutions ought to prioritize innovation and leverage emerging technology to address the problems presented by the COVID-19 epidemic. The abovementioned strategies encompass simulation-based training, virtual and augmented reality, flipped classrooms, teleconferencing, and social media platforms (Adelowotan, 2021). Enhancing the communication infrastructure, facilitating access to online resources such as data, computers, and modems for students and staff, and transitioning from conventional examinations to online assessment methods (Mncube *et al.*, 2021) are other recommended measures.

5 Conclusion

The research findings have demonstrated that the Coronavirus pandemic has had detrimental impacts on higher education systems in South Africa. The COVID-19 pandemic has significantly affected various aspects of higher educational institutions, including research endeavors, academic programs, professional development opportunities for personnel, and employment prospects within the academic sector. The effects were experienced by various educational entities, including educational institutions, educators, students, parents, and other relevant stakeholders. The impacts are further summarized under the research questions as follows:

5.1. What are the effects of the COVID-19 pandemic on South African higher education systems?

The effects of the COVID-19 pandemic on South African higher education systems are multifaceted, as highlighted in this thesis, including the health, emotional, psychological, physical, educational, and financial impacts, to mention a few.

5.2. To what extent has the COVID-19 pandemic impacted the South African higher education system as compared to the experiences before and after the pandemic?

The COVID-19 pandemic impacted South African higher education systems profoundly due to the prolonged lockdown and isolation. Thousands of deaths and the spread of the disease were recorded. Learning was solely online, and contact classes were suspended. Unequal distribution of the required digital infrastructure for online learning was a problem for many higher institution students.

5.3. What are the driving forces behind the factors responsible for the COVID-19 pandemic's impact on the South African higher education system?

The factor responsible for the COVID-19 pandemic's impact on the South African higher education system is the lack of preparations in terms of digital and health infrastructures. The driving forces behind these factors are government policies and investments tailored towards effective higher educational operations in situations such as the COVID-19 pandemic era.

5.4. What are the best practicable development control and management approaches to prevent the future occurrence of the COVID-19 pandemic impact on the South African higher education system?

The recommended practicable development control and management approaches to prevent such magnitude of impacts in the future COVID-19 pandemic are: i) Capacity building and (ii) Development management.

Capacity-building involves strengthening and developing the infrastructures, resources, processes, capacities, instincts, and skills. The South African higher education systems need to thrive, adapt, and survive in a pandemic. At the same time, development management deals with managing development proactively in South African education systems to achieve the vision and objectives of capacity-building. It emphasizes the pre-application stage and the delivery of sustainable development.

The study underscores the imperative of integrating technology into the educational sphere to mitigate the impact of the Coronavirus and any future pandemics on the field of education. Therefore, this paper acknowledges the potential adverse effects of the global closure of schools due to the Coronavirus. However, it argues that this decision is justified due to the rapid transmission rate and the significant risks posed by the COVID-19 pandemic. The school closures due to the Coronavirus pandemic served as a valuable lesson and cautionary tale for the global education community, especially for those who did not embrace or implement emerging learning technologies that facilitate online or remote education. Stakeholders within the education sector must formulate comprehensive strategies to address the challenges and opportunities arising in the aftermath of the Coronavirus pandemic.

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