

**DURBAN UNIVERSITY OF TECHNOLOGY**

**THE IMPACT OF COVID-19 VACCINE COMMUNICATION ON STAFF  
AND STUDENTS' CHOICE OF VACCINATION AT A SOUTH AFRICAN  
UNIVERSITY**

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**10 APRIL 2025**



**THE IMPACT OF COVID-19 VACCINE COMMUNICATION ON STAFF AND  
STUDENTS' CHOICE OF VACCINATION AT A SOUTH AFRICAN UNIVERSITY**

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## ABSTRACT

Following the global rollout of COVID-19 vaccines in 2020, Durban University of Technology (DUT) introduced its own vaccination programme for staff and students, supported by targeted communication and institutional policies. While these efforts aimed to boost vaccine uptake, there is limited research on the impact of communication on vaccination decisions within the context of a South African University of Technology (UoT). This study addresses that gap by examining how DUT's vaccine communication shaped the choices of its university community. Using a mixed-method approach, data was collected through questionnaires and interviews with 97 students and 49 staff members. Findings revealed that DUT used multiple communication channels, including weekly email updates. While some participants appreciated these efforts, others found the communication inconsistent and unclear. As a result, many turned to external sources such as health professionals, World Health Organisation and Department of Health websites, news and social media for trusted information. It was also discovered that vaccination choices were shaped by perceived risks, protection for self and family, side effects, mandatory policies, travel, job security, and traditional medicine comparisons.

The study recommends that DUT enhances message clarity, actively engage stakeholders, and involve staff and students in co-creating clear and reliable future communication. Doing so will foster transparency and build trust between the university and its community, aligning with DUT's Living Values Framework. These steps will help shape more effective crisis communication strategies in the future.

**Key words:** COVID-19 awareness, COVID-19 messages, COVID-19 vaccine, vaccine communication, vaccination decisions, staff and students' choice, and university of technology.

## DECLARATION

I hereby declare that this thesis represents my own original research and has never been submitted for any degree in any other university. The research conducted is in line with the guidelines of the Institutional Research and Ethics Committee.

- The discussed findings in this thesis are my own original study.
- Illustrations, references and excerpts in this thesis have been acknowledged.
- All references in this thesis are accurately indicated.
- This thesis does not include personal information of the participants.

Lungelo Princess Funeka

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10 April 2025

## **DEDICATION**

I dedicate this thesis to myself (Lungelo Princess Funeka) and my parents, Lindi Victress Funeka and Mhawu Richard Funeka. Furthermore, I would like to also dedicate it to my siblings Lulama Onicca Funeka, Luyanda Fortunate Funeka and Landile Luwanda Funeka. Lastly, the dedication goes to my nephew Samkelo Bryce Khumalo and my niece Lufuno Khumalo.

This thesis is for the future generation of my clan.

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## ACRONYMS

BBC:	Behaviour Change Communication
CABG:	Coronary Artery Bypass Grafting
COVID-19:	Coronavirus Disease 2019
DHET:	Department of Higher Education and Training
DoH:	Department of Health
DUT:	Durban University of Technology
GBV:	Gender-based Violence
HPV:	Human Papillomavirus
HBM:	Health Belief Model
HEIs:	Higher Education Institutions
HIV:	Human Immunodeficiency Virus
HIV/AIDS:	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IMB:	Information Motivation Behavioural Skills Model
KZN:	KwaZulu-Natal
RTT:	Response Task Team
STDs:	Sexually Transmitted Diseases
TTM:	Transtheoretical Model
TB:	Tuberculosis
UoT:	University of Technology
WHO:	World Health Organization

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## CHAPTER 1

### INTRODUCTION AND BACKGROUND OF THE STUDY

#### 1.1. INTRODUCTION

Some of the biggest mistakes people make in a crisis are failing to take action, not improving the quality of the decision-making process and implementing ineffective communication strategies (Kim and Kreps 2020; Noar and Austin 2020; Schippers and Rus 2021). These mistakes are consequences of unpreparedness and unclear communication which can cause confusion and result in disastrous outcomes prolonging a crisis (Costa 2020; Kim and Kreps 2020). Consequently, the existing public health communication strategies and prevention measures were tested in January 2020 when the World Health Organisation (WHO) declared that the outbreak of the coronavirus disease (COVID-19) constitutes a global health crisis as it is a Public Health Emergency of International Concern (Mahase 2020). This necessitated the need to explore the impact of COVID-19 vaccine communication on staff and students' choice of vaccination at a South African University.

When COVID-19 surfaced it was called the 2019 novel coronavirus, shortened for 2019-nCoV (Meng, Hua and Bian 2020). The WHO defines COVID-19 as a "disease caused by a virus" and the virus that causes the COVID-19 disease is called "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)" (WHO 2020: para 2). COVID-19 started in December 2019 in Wuhan, China and later was referred to as a health crisis or a pandemic as it affected the global population (Mukandavire *et al.* 2020; Phelan, Katz and Gostin 2020).

In Africa, the first case of COVID-19 was reported in February 2020 in Egypt (Anjorin *et al.* 2021). In South Africa, the first case of COVID-19 was confirmed in one of the nine South African provinces; namely, KwaZulu-Natal (KZN) on the 5<sup>th</sup> of March 2020; which led to the President, Mr. Cyril Ramaphosa to declare a hard lockdown as of the 27<sup>th</sup> March 2020 with Alert level 5 from the 26<sup>th</sup> of March 2020 midnight; as one of the COVID-19 response strategies to curb the spread of the virus (Giandhari *et al.* 2021; Velavan and Meyer 2021).

According to Arndt *et al.* (2020); du Plessis *et al.* (2022), the South African government had to legally respond to the COVID-19 pandemic by either utilizing the Disaster Management Act 57 of 2002 or use Section 37 of the country's Constitution by declaring a state of emergency. Dr. Nkosazana Dlamini-Zuma, the South African ex-Minister of Co-operative Governance and Traditional Affairs (COGTA) declared the national state of disaster which was announced by Ramaphosa on the 15<sup>th</sup> of March 2020 for three months, just 10 days after the first case had been identified (Morris *et al.* 2020; Balvers *et al.* 2021). In South Africa, the first death from

the COVID-19 pandemic was reported in KZN. Furthermore, during the first level lockdown, cases kept on increasing which resulted in the extension of the lockdown in April 2020 (Giandhari *et al.* 2021). On the 4<sup>th</sup> April 2022, as “*laboratory-confirmed cases were 3,667,560*” after 750 days President Ramaphosa announced that the Cabinet decided to terminate the national state of disaster as it did no longer meet the requirements (DailyMaverick 2022; EWN 2022).

For the South African education sector, the lockdown and closure measures disrupted the academic and social interaction of staff and students, teaching and learning and the academic calendar (Gustafsson and Deliwe 2020; Shepherd and Mohohlwane 2021). The education sector is one of the biggest sectors in South Africa with two departments, the Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET) (Taylor 2011; Van Der Berg and Hofmeyr 2018). The DBE nationally focuses on primary and secondary schooling and the DHET is for vocational training and higher education (Government of South Africa 2024). The DHET in comprises of Higher Education Institutions (HEIs) such as private colleges, private higher education institutions, Technical and Vocational Education and Training (TVET) colleges and universities (Papier and Needham 2022). The University Education Branch under DHET “develops and coordinate policy and regulatory frameworks for effective and efficient university education system” (DHET 2022).

South African HEIs have a variety of the population from different backgrounds and their role in a society is to equip individuals with knowledge that contributes to growth, health and the safety of communities (Brennan, King and Lebeau 2004; Ogude, Nel and Oosthuizen 2005; Badat 2010; Walker and McLean 2013; Mzangwa 2019). Consequently, universities need to constantly inform, educate staff and students about global health issues. From March 2020, South African HEIs had to transition from face-to-face campus operations to online teaching and learning (Jili, Ede and Masuku 2021; Landa, Zhou and Marongwe 2021). During this transition, the WHO made major progress with the COVID-19 vaccination response (WHO 2020: line 2).

To generate evidence for vaccine safety and efficacy, the clinical trials for COVID-19 vaccine were evaluated in August 2020 at an early stage in South Africa (Makoni 2020:79). Research indicates that the first African COVID-19 vaccine trial was conducted at the University of the Witwatersrand (Wits), Johannesburg where participants were screened and enrolled in an experimental COVID-19 vaccine study by Novavax, a US drug developer (Makoni 2020). After the success of the clinical trials, the vaccination programmes started globally. In the absence of the cure for COVID-19, vaccine communication and vaccine rollout programmes were vital to mitigate the spread, yet some South African citizens were hesitant to vaccinate against

COVID-19 (Tasnim, Hossain and Mazumder 2020; Dzinamarira *et al.* 2021). Research indicates that vaccines are essential to the public health crisis, herd immunity and in economic and social life (Cooper, van Rooyen and Wiysonge 2021).

According to Dzinamarira *et al.* (2021) the first African country to receive the COVID-19 vaccine was South Africa and soon after the country started its vaccination rollout programme in February 2021. However, South African citizens were hesitant to be vaccinated based on the lack of awareness, misinformation, religious beliefs and cultural beliefs (Cooper, van Rooyen and Wiysonge 2021; Sewpaul *et al.* 2023). Other African countries rolled out their COVID-19 vaccine amidst the Delta variant, a third wave of infection which was thriving between May and July 2021 (Impouma *et al.* 2022). The rollout of COVID-19 vaccines programmes faced numerous challenges in African countries. The main challenges were with the reciprocation after successful vaccination trials among African countries' population and the need to decentralise the manufacturing of the COVID-19 vaccine locally (Nachega *et al.* 2021). The acquiring and rollout of the COVID-19 vaccine resulted in challenges of vaccine access and vaccine nationalisation and as a result vaccine acceptance and vaccine hesitancy spawned concerns (Eaton 2021; Lancet 2021). In South Africa, vaccination rollout lessened the lockdown restrictions as various sectors reopened to boost the country's economic status that was severely affected by the COVID-19 pandemic (Chitungo *et al.* 2021; Dube 2022; Edholm *et al.* 2022).

South African HEIs were encouraged to use their discretion within the established and published national government response plan for reopening their universities (van Schalkwyk 2021). Under the leadership of the then Minister of DHET Dr. Blade Nzimande advised HEIs to submit their phase in plans for approval that addressed on campus health protocols such as the provision of face masks, sanitation stations and screening (Government Communications 2020). South African universities used different approaches to reopen their campuses and most adopted a blended learning approach to cater for the social inequalities of their students (Simelane 2021; Maphalala and Ajani 2023).

Furthermore, guided by the WHO and the national government COVID-19 response strategies, the South African HEIs were obligated to form COVID-19 Response Task Teams (RTT) (van Schalkwyk 2021). Strict COVID-19 protocols had to be in place and published on the HEI's formal communication channels such as websites for staff and students to return to campus. In June 2020, the DHET directed universities to partially reopen by allowing first-year students to attend on campus and by August 2020 universities were permitted a further reopening (DHET 2020; Cañares and van Schalkwyk 2022). The South African education sector joined the fight to minimise the spread of COVID-19 by developing their COVID-19

response strategies and launching their vaccine rollout programmes (Modi, Pretorius and Francis 2022). During this stage, communication was vital for university stakeholders.

Research has shown that tailored messages, trusted messengers, factual and evidence-based information and clear communication is crucial to encourage vaccination through health promotion campaigns and vaccine communication (Larson *et al.* 2011; French *et al.* 2020; Olson, Berry and Kumar 2020; Crawshaw *et al.* 2022; Chirico and Teixeira da Silva 2023; Williams *et al.* 2023). As staff and students returned to campus, universities launched their COVID-19 vaccine rollout programmes. The COVID-19 vaccine rollout programmes presented the need to address the importance of health education, health promotion campaigns, COVID-19 awareness, vaccination hesitancy and the development of vaccine communication strategies to debunk COVID-19 vaccine myths, misinformation and encourage vaccination among staff and students.

## **1.2. CONTEXT OF THE STUDY**

The education sector is often affected by external factors such as globalisation and transformation which requires them to adopt change. As HEIs try to embrace change and transformation in a modernised world, the outbreak of a new deadly virus affected the sector, globally. In December 2019 in Wuhan, China, the novel virus Coronavirus Disease 2019 (COVID-19) originated and begun to spread globally (Mukandavire *et al.* 2020:1). As a result, in March 2020, the South African President Mr. Cyril Ramaphosa declared a National State of Disaster with countermeasures to develop and implement response strategies to fight the spread of COVID-19 (Arndt *et al.* 2020:2). President Ramaphosa's announcement received diverse feedback, from critics to conspiracy theories spreading the misinformation and fake news that caused panic, fear and threat to public health.

New safety regulations were implemented starting with a hard lockdown that affected the country's economy. Most people that were under lockdown and quarantine needed assurance and correct information about the COVID-19 pandemic. The WHO forged a partnership with different social media platforms to provide accurate updates about the COVID-19 and vaccine development (Tasnim, Hossain and Mazumder 2020:172). According to Cooper, van Rooyen and Wiysonge (2021:1), it is vital to accept the vaccine as it "protects the population, reopens the socio-economic life". Amidst the crisis, it is crucial to develop response strategies that will address the situation at hand, same as when there is a global health crisis. The literature suggests that COVID-19 vaccine communication strategies can be developed to establish trust and transparency to South African citizens and minimise the hesitancy or unwillingness to take the vaccine by changing people's perceptions (Engelbrecht, Heunis and Kigozi 2022; Steenberg *et al.* 2022).

This necessitates the need to research the factors that influences and causes vaccine hesitancy or unwillingness to be vaccinated and to investigate the factors that may influence COVID-19 vaccination decision-making. If experts purport that the vaccine is the best way of dealing with the COVID-19, why are people hesitant to take it? This question necessitates research studies to uncover the insights of staff and students about vaccination based on vaccine communication and information disseminated to them by their university.

### **1.3. PROBLEM STATEMENT**

The impact of COVID-19 pandemic in HEIs will go down in history books, just like N1H1 (Spanish flu, Russian flu, swine flu) and Ebola (Kolata 2001; Vigsø 2010; Coltart *et al.* 2017; Liliana *et al.* 2021) in an African context. Due to the global health crisis, HEIs in South Africa had to plan their response programme by firstly forming crisis response committees and COVID-19 RTTs to deal with uncertainties about the pandemic. The COVID-19 RTTs were responsible for developing and implementing response programmes to create COVID-19 awareness, COVID-19 acceptance, developing strategies to reduce and eliminate the threat of increasing numbers of infection cases in the university community. South African HEIs play a vital role in influencing citizens of a country as Wang (2006:234); Toquero (2020) found that individuals (staff and students) in HEIs are more likely to influence the perceptions and attitudes of their society as compared to those who are not in HEIs. Thus, how the education sector received and interpreted the messages from the disseminated COVID-19 vaccine communication impacts the society at large.

The latest COVID-19 pandemic with its different variants has propelled the South African government to launch the vaccine rollout programme to mitigate the spread of the virus, even though there were “waves or variants” that made it impossible to win the fight against the pandemic. As HEIs have a variety of populations which fits the criteria of the 2021 South African government vaccine rollout programme, most HEIs have launched their vaccination campaigns and programmes. Moreover, HEIs distributed COVID-19 vaccine communication through their formal communication channels for staff and students to ease their fears whilst providing accurate information. However, staff and students had access to use other multiple sources to research more information about COVID-19 vaccine and vaccination information. These sources were the mass media, scholarly articles, government updates, health experts and social media. These multiple sources had information that influenced staff and students’ vaccination decision-making.

According to Oh and Lee (2019), health messages can be posted by anyone on social media hence it is difficult to verify some of them, especially when posted by influential social media accounts hence it is crucial for staff and students’ to verify COVID-19 information and COVID-

19 vaccination information that they have sourced from multiple sources with vaccine communication disseminated through the university's formal communication channels (Bode and Vraga 2018; Borah and Xiao 2018). Therefore, this necessitated the need to conduct research in a HEI to identify the response strategies used to create COVID-19 awareness and COVID-19 acceptance among staff and students. Thus, the process used by staff and students to source and verify COVID-19 information and vaccination information need to be investigated by revealing the type of COVID-19 vaccine and vaccination information that influenced staff and students' decision to vaccinate against COVID-19. The findings will be a blueprint that can be used to develop communication strategies in response to a health crisis or other social pandemics in the future.

Though the infection numbers fluctuated, and some South African citizens have been vaccinated, KwaZulu-Natal where this study was conducted remained as one of the provinces with the highest COVID-19 infections in South Africa. On the 19<sup>th</sup> of January 2022, the latest confirmed COVID-19 cases in South Africa were reported by the National Institute for Communicable Diseases (NICD) which revealed that KwaZulu-Natal was the 2<sup>nd</sup> province with higher infection cases following the Gauteng province which was on 1<sup>st</sup> place (NICD 2022). Moreover, only "27% South African population has been fully vaccinated" as of 12 January 2022 (Suleman and Lucero-Prisno III 2022: 1). Therefore, the identified problem for this study is the lack of adherence to COVID-19 protocols, vaccine hesitancy and excess to external sources for COVID-19 related information.

#### **1.4. AIM OF THE STUDY**

This study aims to investigate the impact of COVID-19 vaccine communication on staff and students' choice to vaccinate against COVID-19 at a South African University of Technology (UoT).

#### **1.5. RESEARCH QUESTIONS**

The research questions served as a guide to achieve the objectives of the study:

- Which communication channels did the Durban University of Technology (DUT) use to create COVID-19 awareness among staff and students?
- How did staff and students' source COVID-19 vaccine and vaccination information?
- Which process was used by staff and students to verify COVID-19 vaccine and vaccination information?
- Which COVID-19 vaccination information influences staff and students' vaccination decision-making?

## 1.6. OBJECTIVES OF THE STUDY

To achieve the main aim of this study, the objectives below will be used as a guide to conduct research:

- To identify the communication channels used by DUT to create COVID-19 awareness among staff and students.
- To explore staff and students' source for COVID-19 vaccine and vaccination information.
- To explore the process used by staff and students to verify COVID-19 vaccine and vaccination information.
- To determine COVID-19 vaccine information that influences staff and students' vaccination decision-making.

## 1.7. SIGNIFICANCE OF THE STUDY

This study is significant as it was conducted during the global rollout of COVID-19 vaccine programme in 2023 where only 35% of the country population was fully vaccinated (Gavi 2023: para. 3 line 4). This study aligns with *Chapter 10 "Promoting Health"* of the South African National Development Plan (NDP) 2030: Our Future – make it work document (Republic of South Africa 2012: 338). The NDP 2030 Chapter 10 emphasises the "*PRIORITY 4: Prevent and reduce the disease burden and promote health*" which is related with this study as it seeks to analyse the impact of COVID-19 vaccine communication on staff and students' choice to vaccinate against COVID-19 at a South African UoT. Moreover, the problem of this study is the lack of adherence to COVID-19 protocols, excess to external sources for COVID-19 related information and vaccination hesitancy among staff and students. This problem is in line with the NDP 2030 Chapter 10, because the researcher aims to investigate the impact of the implemented COVID-19 Vaccine Communication as a strategy to "*prevent and reduce the disease burden and promote health*".

Globally, this study is relevant to the Sustainability Development Goal 3 (SDG3): '*Good Health and Well-Being*', of the 2030 Agenda for Sustainable Development. Sustainable Development Goals (SDG3) appeals all countries "to ensure healthy lives and promoting well-being for all ages" (United Nations Childrens Fund (UNICEF) 2024: para. 1 line 1). This study intends to offer insights into how the institution under the study promoted well-being and ensured healthy lives during a global pandemic.

HEIs stakeholders includes academic professionals, staff and students who holds a status of influence in society. Their influence may be unintentional hence it is important that they are knowledgeable and informed on issues related to public health crisis. With the availability and

administration of COVID-19 vaccines in universities, it is crucial for universities to develop and implement COVID-19 vaccine communication strategies that addresses vaccine hesitancy, align with factors that may influence vaccination decision-making, change of attitudes, behaviour and cultural beliefs about vaccination of staff and students. The findings and recommendations of this study may benefit the case university by understanding their staff and students needs better. This will assist in the development and implementation of health-related policies and improve the university's vaccine communication strategies. The findings of this study may contribute to research in Behaviour Change Communication and may be used as a foundation for future research in Communication Management, Health Education and Health Promotion.

### **1.8. INSTITUTION UNDER STUDY**

Ideally, higher education institutions (HEIs) are complex establishments with a variety of populations from different backgrounds. In South Africa, HEIs include traditional universities, Technikons or Universities of Technology (UoT) and Comprehensive universities. These universities have different types of target market or prospective students guided by the DHET, then led by the Minister Dr. Blade Nzimande. South African HEIs play a vital role in influencing the youth of the country by offering a conducive and safety environment which will contribute to student development and produce quality graduates that can compete in a global environment. Like business organisations, universities have a social responsibility to conduct research studies that may contribute to the awareness about the pandemic and to protect the health of various stakeholders, staff and students (Nchabeleng 2018). Therefore, the success of academic activities and service delivery is dependent on the healthy, strong relationships between staff and students in a university community. This study was conducted at the DUT located in KZN, a province that recorded its first case of COVID-19 in South Africa in 2020 (Giandhari *et al.* 2021). How DUT as an institution of higher learning responds to a crisis and urgent external crisis has an impact on the institution's reputation. The ability to manage transition and urgent crises in a forever changing competitive environment requires effective leadership and management (Black 2015).

The transitioning of UoTs in a global higher education landscape requires institutions to create a competitive environment by developing and implementing strategies that enhance reputation and cement their place in the market. However, these strategies can be affected by external factors such as a global health crisis (Calonge *et al.* 2021). Since the amalgamation of ML Sultan and Technikon Natal to form the Durban Institute of Technology (DIT), which was later changed to DUT, the institution has been portrayed negatively by the media, especially at the beginning of the year. The negative media coverage stems from students' protests with issues

related to lack of students funding, students' enrolment, students' fees and students' accommodation.

The DUT is a South African HEI, located in two cities which are Durban and Pietermaritzburg in the province of KwaZulu-Natal. In April 2002, the Durban Institute of Technology (DIT) was formed through the merger of ML Sultan and Technikon Natal. To emerge as the leading University of Technology (UoT) in Africa, in 2006 the DIT changed its name to the DUT. The DUT prioritises academic research, quality teaching and learning and with nearly 33 000 students registered in six Faculties; namely, Faculty of Accounting and Informatics, Faculty of Applied Sciences, Faculty of Engineering and the Built Environment, Faculty of Health Sciences, Faculty of Arts & Design and Faculty of Management Sciences (DUT 2021a). DUT prides itself with fostering entrepreneurship, technological training, research and innovation (DUT 2020a). In 2023 DUT ranked TOP 600 amongst the World University Rankings. This UoT was selected as case study for this study because it has two campuses in Pietermaritzburg, KwaZulu-Natal where the first case of COVID-19 was identified and recorded in March 2020 in South Africa.

Most students enrolled at the DUT are from different backgrounds which includes first-generation students (DUT 2018: 34). According to Checkoway (2018); Museus and Chang (2021), first-generation students are defined as first members among their immediate family to enrol and attend at an institution of higher learning. Studies by Beattie (2018); Verdín, Smith and Lucena (2021) indicates that the first-generation students have influence on their relatives and the community at large as they hold an educated status. Staff and students hold an influential status among their family, friends and the community because they are perceived as informed and educated individuals. However, holding such status does not guarantee the HEIs success to curb the infections of COVID-19, vaccine acceptance and that staff and students will be able to convey messages and information disseminated by their universities about COVID-19 and vaccination.

## **1.9. STRUCTURE**

This thesis contains seven chapters with the list of references and attachments. **Chapter 1** is the INTRODUCTION AND BACKGROUND OF THE STUDY. This chapter provides the introduction, context of the study, problem statement and research questions. Furthermore, the objectives of the study, significance of the study and the name and type of the institution as a case university is discussed. **Chapter 2** discusses the THEORETICAL FRAMEWORK from the field of behaviour change communication. These theories are namely, the Informational Motivational Behavioural Skills Model, the Health Belief Model and

Transtheoretical Model. The aim of this chapter is to explore, link and apply the identified research problem with the existing theories. The LITERATURE REVIEW as **Chapter 3** of this study outlines the literature that draws from Communication Management, Health Education and Health Promotion. The literature review focuses on the history of health crisis in South African HEIs, comprehensive perspectives of vaccine communication and vaccinating for COVID-19 in the education sector. Moreover, factors influencing vaccine decision-making and the process of vaccinating for COVID-19 in the education sector is discussed. The literature review chapter concludes with the research gap of the study and conceptual framework.

In **Chapter 4**, the RESEARCH METHODOLOGY presents the research process that was followed in the study. This chapter discusses the research paradigm, outlines the research design and identifies the target population of this study. It further discusses the research sampling, measuring instruments for data collection, the process of data analysis, pre-testing procedure and the scope of the study. To ensure reliability and validity of the study, this chapter explains triangulation and indicates how the researcher ensured anonymity and confidentiality. Furthermore, ethical considerations and the process of obtaining the permission to conduct the study is addressed.

**Chapter 5** provides the PRESENTATION OF FINDINGS for the study by presenting the biographical information of the participants who were part of the interviews and responded to a survey. Biographical information is presented in the form of figures and graphs. The process of ensuring reliability of questions, hypothesis testing, and triangulation is outlined. Furthermore, the results of the findings based on the analysis gathered through the interviews and survey is discussed.

**Chapter 6** is the DISCUSSION OF THE RESEARCH FINDINGS. In this chapter, four main themes; namely, employed communication channels, sources for COVID-19 vaccine information, verification of COVID-19 vaccine information and COVID-19 vaccination decision-making are discussed. The literature and tables will be used to elaborate on the findings.

**Chapter 7** concludes the study by discussing the CONCLUSION AND RECOMMENDATIONS. This chapter highlights the identified research problem, aim and objectives of the study by summarising the findings per achieved objectives. Furthermore, this chapter discusses the limitations of the study, new knowledge, policy implications and recommendations for future research.

## **1.10. CONCLUSION**

This study is significant as it aligns with Chapter 10 of the NDP 2023 and SDG 3. It was conducted during the global implementation of the COVID-19 vaccination rollout programme. Globally, the vaccination rollout programmes faced challenges such as vaccine hesitancy,

vaccine dropout, misinformation and inaccurate information. The literature indicates that vaccine hesitancy stems from misinformation, myths and rumours posted on informal communication channels. In this study, formal communication channels refer to communication distributed by the university and informal communication channels refers to information accessed by staff and students through different media platforms. This study aims to investigate the impact of COVID-19 vaccine communication on staff and students' choice to vaccinate against COVID-19 at a South African UoT hence the four objectives are: to identify communication channels used by DUT to create COVID-19 awareness among staff and students, to explore staff and students' source for COVID-19 vaccine and vaccination information, to explore the process used by staff and students to verify COVID-19 vaccine and vaccination information and to determine COVID-19 vaccine information that influences staff and students' vaccination decision-making.

The findings of this study contribute to research in the field of Behaviour Change Communication and might serve as a foundation for interactive communication strategies in health education and may recommend ways to improve health communication, health education and health promotion in higher education institutions. The following chapter will discuss the relevant theoretical frameworks to explore the identified research problem. These theories are derived from the behaviour change communication; namely, the Information Motivation Behavioural skills model, the Health Belief Model and the Transtheoretical Model.

## CHAPTER 2

### THEORETICAL FRAMEWORK

#### 2.1. INTRODUCTION

This chapter will present the theoretical framework that the study is based on. As the structure that supports a theory of the study, the theoretical framework will introduce and describe theories explaining the identified research problem. The theories will be explored with the intention of supporting the ideas of the study by linking them to the research problem, research objectives and research questions. Furthermore, the theories will explain how the researcher recognizes the link between health behaviours and vaccination decision-making with the university's COVID-19 RTTs prevention strategies. The theoretical frameworks for this study are guided by the theories of behaviour change communication for health promotion, which are the Health Belief Model (HBM), Information Motivation Behavioural Skills Model (IMB) and The Transtheoretical Model (TTM). These theories provide the background of the study with the intention of analysing and understanding the identified problem from the previous chapter (Chapter 1). This study will analyse the impact of vaccine communication on staff and students' choice of vaccination for COVID-19 by identifying the strategies of Behaviour Change Communication and applying the HBM, IMB and the TTM for COVID-19 awareness and vaccine acceptance.

#### 2.2. BEHAVIOUR CHANGE COMMUNICATION

The Behaviour Change Communication (BCC) is a process used interactively with individuals or communities to understand their situation by developing messages that respond to the concerns within those situations (Kalita 2006: 14). BCC is classified as communication development with models designed to assist researchers to understand why people behave in a certain way (Ngigi and Busolo 2018: 86; Emadzadeh and Vakili 2020). Moreover, BCC is a communication strategy which encourages individuals, groups or communities to change their behaviour (Abdullahi 2022). BCC in health promotion is regarded as a crucial aspect as a measure of intervention in different types of health issues (Ngigi and Busolo 2018). To promote health behaviours that are suitable to social conditions by assisting individuals, groups and communities to deal with their persistent health issues, BCC is an interactive process that serves as a guide to create communication strategies. To encourage COVID-19 vaccination in a university community, the university need to integrate BCC strategies in their health communication strategies. In this section, the strategies of BCC will be explained and linked to the identified research problem of this study.

### 2.2.1. Strategies of Behaviour Change Communication

Effective vaccine communication is ongoing and adaptable (Chou and Budenz 2020). The university COVID-19 RTTs can develop and implement BCC strategies to create COVID-19 awareness and encourage COVID-19 vaccination for staff and students. Continuous assessment on the impact of vaccine communication can assist COVID-19 RTT to adjust their communication strategies based on staff and students' perceptions and on the feedback provided from the implemented BCC strategies (Merkley and Loewen 2021). For this study, the BCC strategies are multiple communication channels, strategic messaging, messengers, clear information, social norms, staff and students' engagement platforms and loyalty programmes.

#### 2.2.1.1. *Multiple Communication Channels*

COVID-19 RTTs can communicate with staff and students utilising the easily accessible multiple communication channels such as the university website, emails, staff and student's portal, social media, host webinars, campus noticeboards and SMSes (Clement *et al.* 2020; Neves de Souza *et al.* 2023). To inform, educate and create COVID-19 awareness among staff and students, the COVID-19 RTT needs to ensure that all messages and communication disseminated through these channels are accurate and consistent all the time.

#### 2.2.1.2. *Strategic Messaging*

Strategic messaging requires proper message framing by researching the type of COVID-19 information and vaccination information that resonate with staff and students (Su *et al.* 2021; Hines 2022). Message framing is the strategy used by communicators to "present information that can possibly change the attitudes or behaviours of recipients" (Hines 2022: 14). Addressing fears, concerns and vaccine hesitancy using strategic messaging can create COVID-19 awareness and encourage vaccination.

#### 2.2.1.3. *Messengers*

The COVID-19 RTT needs to identify messengers within the university faculties such as influential lecturers and students' leaders to equip them with COVID-19 regulations that they will communicate among the university community (Favero *et al.* 2021). This is evident in the findings of the research study conducted in Philadelphia, Pennsylvania that explored the link between trusted messengers and the inclusion of community based organizations for health promotion strategies and tailored COVID-19 vaccine messages (Shen *et al.* 2023). Therefore, staff and students will be able to pay attention to and be influenced by the messengers who are their role models.

#### 2.2.1.4. *Clear Information*

Before vaccinating, individuals need to be provided with the necessary vaccine information that will be easily understood (Bothun, Feeder and Poland 2022). To inform, educate and create COVID-19 awareness and vaccine acceptance the COVID-19 RTT needs to provide accurate and clear information about the disease. The use of simple language and visuals in addressing misconceptions and doubts about vaccination can increase the likelihood of vaccination of staff and students. The use of visual narrative messages to encourage COVID-19 vaccine uptake is emphasised by Shanahan *et al.* (2023) as a strategy for more effective risk communication approaches.

#### 2.2.1.5. *Social Norms*

Research studies conducted by Brewer *et al.* (2017); Palm, Bolsen and Kingsland (2021) have suggested portraying vaccination as a social norm as well as a strategic approach to foster vaccination. Social norms have been linked with students' willingness to vaccinate with influenza vaccine and human papillomavirus vaccine (HPV) and COVID-19 vaccine (Quinn *et al.* 2017; Stout *et al.* 2020; Abdallah and Lee 2021). In an education sector, the diverse university population requires the COVID-19 RTT to understand the social norms of staff and students. When communicating with staff and students, the COVID-19 RTT can emphasise the vaccination rates among the university community and make it evident that adhering to COVID-19 regulations and vaccination has become the university norm. The findings of the studies by Evans *et al.* (2023); Moehring *et al.* (2023) revealed that pro vaccination videos on social media platforms that documents the vaccination journey of individuals can increase the vaccination rate. The behaviour displayed on the videos can be perceived as the social norm and increase vaccine confidence to the unvaccinated individuals (Evans *et al.* 2023). This can lower chances of new infections, minimize COVID-19 transmission and encourage vaccination. Therefore, staff and students will succumb to social pressure to accept and vaccinate against COVID-19. Social norms can be included in COVID-19 vaccine communication as a behaviour change strategy. This will increase the chances of other staff and students to adhere to COVID-19 regulations and encourage vaccination.

#### 2.2.1.6. *Staff and Students' Engagement Platforms*

The COVID-19 RTT need to create engagement platforms for the university community. Engagement platforms can range from student led discussions, trainings and webinars where staff and students can share their concerns, fears and experience related to COVID-19 and vaccination (Ali, Ashiru-Oredope and Murdan 2021; Griswold *et al.* 2022; Bowen *et al.* 2023; Kobayashi *et al.* 2023). Relatable experiences can put staff and students at ease with regards to COVID-19 and vaccination. Personal stories of staff and students who have been impacted by COVID-19 can be included in weekly updates provided by the COVID-19 RTT to indicate

the importance of vaccination to prevent news cases and transmission of COVID-19. These stories will assist the COVID-19 RTT to supplement statistics and add emotional appeal to encourage staff and students to vaccinate for COVID-19.

#### 2.2.1.7. *Loyalty Programmes*

Loyalty programmes such as loyalty points and monetary incentives have been explored in studies encouraging influenza, HPV and COVID-19 vaccines which revealed that incentives can increase the vaccination acceptance and influence vaccination decision-making (Yamin and Gavius 2013; Rockliffe *et al.* 2018; Campos-Mercade *et al.* 2021). However, other studies argued that incentives do not increase the willingness of individuals to vaccinate against COVID-19 immediately due to various reasons (Shmueli 2021b; Lee *et al.* 2022). The study by Persad and Emanuel (2021) explored the ethical aspects of incentives. Their findings revealed that individuals perceived incentives programmes as coercive, exploitative and they minimize the willingness to vaccinate without being rewarded (Persad and Emanuel 2021). Although monetary incentives are frowned upon as a strategy to encourage vaccination, rewards such as vouchers or discounts can be considered in the education sector. COVID-19 RTT can offer rewards for staff and students who vaccinated such as discounts on university associated conferences, exclusive invitation to university events and sponsorship for social and sports activities that might impact the university image. This will encourage vaccination and minimise vaccination dropouts.

### **2.3. INFORMATION MOTIVATION BEHAVIOURAL SKILLS MODEL**

To understand and explain behaviours related to Human immunodeficiency virus (HIV) and the Acquired immunodeficiency syndrome (AIDS), (Fisher and Fisher 1992) proposed IMB model in 1992. The IMB skills model has been used for research studies in the field of health communication investigating its efficacy when integrated in health intervention strategies for diseases such as HIV/AIDS (Fisher, Fisher and Harman 2003; Fisher, Fisher and Shuper 2014), epilepsy (Xu and Wang 2023), diabetes (Osborn 2006; Osborn *et al.* 2010), cervical cancer screening (Wells *et al.* 2021), breast cancer self-examination (Misovich *et al.* 2003), HPV vaccine (Taştekin Ouyaba, Özyürek and Sevil 2023), in coronary artery bypass grafting (CABG) surgery (Zarani *et al.* 2010) in the spread of the COVID-19 pandemic (Lan and Yang 2021); (Kaiser *et al.* 2023) and in prevention measures of the COVID-19 pandemic (Fisher and Fisher 2023). The IMB skills model identifies three constructs required for individuals to adopt health behaviour, which are information, motivation and behavioural skills (Norton *et al.* 2012; Chang *et al.* 2014). To create COVID-19 awareness and encourage vaccination, universities need to identify staff and students' health behaviour that they need to change. Once the behaviour has been identified, the COVID-19 RTT needs to integrate the IMB skills model constructs to their response strategies that aimed to change behaviour. Furthermore,

proper evaluation for the implemented response strategies will assist the COVID-19 RTT to track whether the staff and students have adopted the expected health behaviour.

For this study, the identified *behaviour is noncompliance with COVID-19 protocols and vaccine hesitancy*. Information, motivation and behavioural skills are interlinked for staff and students to adopt health behaviour which is *adherence to COVID-19 protocols and vaccinating for COVID-19*. However, without clear COVID-19 information, effective COVID-19 vaccine communication strategies, lack of enforcement and evaluation of prevention measures and response strategies, staff and students may not consider adopting health behaviour.

### 2.3.1. Information Construct

The information construct in the IMB skills model is required as a “prerequisite of enacting a health behaviour” (Misovich *et al.* 2003: 777). The study by Misovich *et al.* (2003) analysed the impact of integrating the IMB skills model in intervention strategies for diseases such as cervical or endometrial cancer, Types 2 diabetes mellitus and HIV/AIDS. They recommended that for the information construct, health experts need to provide specific information about the diseases and educational information about how individuals should behave or protect themselves from the disease (Misovich *et al.* 2003). Based on this recommendation, informing and educating staff and students may create COVID-19 awareness and encourage vaccination in a university community. In the context of this study, the university’s COVID-19 RTT can inform staff and students about the COVID-19 outbreak, COVID-19 protocols, transmission and symptoms and prevention measures. Furthermore, information about the vaccine availability and when and how to book for vaccination is also an indicator for staff and students to adopt a health behaviour. Once staff and students are informed, they may adhere to the COVID-19 protocols and increase the willingness to vaccinate against COVID-19 to protect themselves.

### 2.3.2. Motivation Construct

The IMB skills model classifies motivation construct to adopt health behaviour in two parts; namely, *personal motivation* which stems from individuals’ attitudes and beliefs relates to specific health behaviour (Fisher, Fisher and Harman 2003; Osborn 2006) and *social motivation* that derives from perceived social norm or social support for adopting specific health behaviour (Fisher and Fisher 1992; Misovich *et al.* 2003; Fisher, Fisher and Shuper 2014). In the context of this study, the personal motivation to adopt health behaviour can stem from staff and students’ attitudes, beliefs (religious, personal and cultural), concerns and fears. Therefore, the university’s COVID-19 RTT will have a responsibility to address concerns and address fears of staff and students in their intervention strategies, response strategies or

prevention strategies. In a university community, personal motivation can increase COVID-19 acceptance and adopt health behaviour following prevention and response strategies.

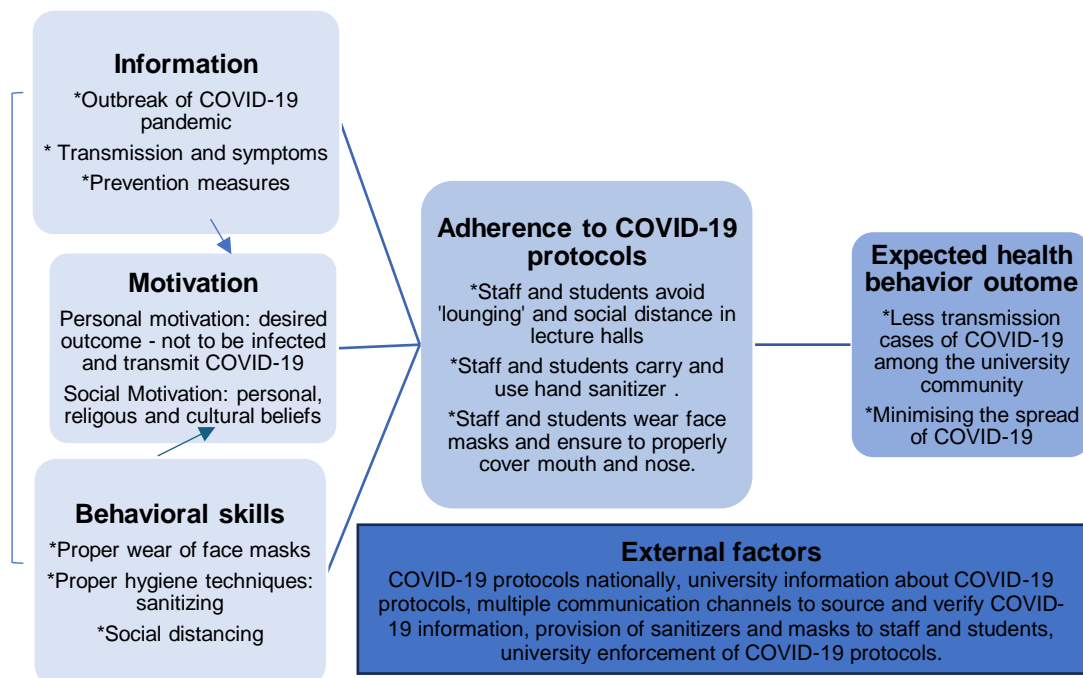
The study by Misovich *et al.* (2003) recommended that for the motivation constructs, health experts need to use different motivation approaches to increase personal motivation by creating platforms for engagement to enhance positive attitudes and beliefs of individuals. These recommendations were affirmed by studies conducted by Rollnick *et al.* (2008); Zarani *et al.* (2010) regarding the efficacy of IMB skills model in patients who had coronary artery bypass grafting (CABG) surgery and to patients who were part of clinical trials hence for the social motivation, Misovich *et al.* (2003) urges health experts to consider social support group to increase social motivation. In the context of this study, the social motivation for staff and students can stem from the university mandatory policies and exclusions. The desire to live normal lives post the COVID-19 pandemic is a social motivation for staff and students to adopt health behaviour (Al-Kumaim *et al.* 2021) hence the social motivation for staff and students may influence their vaccination decisions. This means it is important for the university to constantly disseminate COVID-19 vaccine communication with staff and students because the information about vaccination and vaccines may influence their vaccination decision-making.

### 2.3.3. Behavioural Skills Construct

To enable behaviour change, the behavioural skills in IMB skills model focuses on increasing individuals' objective skills and perceived self-efficacy (Misovich *et al.* 2003). Additionally, objective skills and perceived efficacy are interlinked into individuals behavioural interventions (Misovich *et al.* 2003). To foster behaviour skills, Osborn *et al.* (2010) emphasises on role playing as an opportunity to learn new skills whilst increasing self-efficacy. According to Chu and Liu (2021); Rosental and Shmueli (2021); Jankowska-Polańska *et al.* (2022) the ability of staff and students to understand the risks of COVID-19 may influence their attitudes and beliefs about the vaccinations which may influence their vaccination decisions with the aim of adopting a health behaviour. The factors influencing staff and students to adopt health behaviour by adhering to the COVID-19 protocols are understood as behavioural skills that were informed by knowledge, willingness and ability to social distance, wearing a mask and sanitising. The findings of the study conducted in the United States HEIs revealed that wearing masks is a social responsibility and it is important to teach students about mask protocols to minimise the spread (Vázquez *et al.* 2022). This is affirmed by the findings of the COVID-19 Zambian study conducted by Kaiser *et al.* (2023: 76) that assessed "community knowledge, motivations, behavioural skills, and perceived community adherence to prevention behaviours" based on the IMB skills model.

### 2.3.4. Application of IMB Skills Model for adherence to COVID-19 protocols and vaccine acceptance

During the outbreak of COVID-19, the university's COVID-19 RTT implemented various prevention measures and response strategies to minimise the spread of COVID-19 and encourage COVID-19 vaccine acceptance for staff and students. In the context of this study, the researcher identified the targeted health behaviour which is the staff and students' compliance with COVID-19 regulations through practicing social distancing, wearing of face masks and sanitising. The information construct emphasises the information about the COVID-19 outbreak, transmission and symptoms of COVID-19 and prevention measures. The motivation construct highlights the personal motivation (desired outcome – not to be infected and transmit COVID-19) and the social motivation (personal, religious and cultural beliefs). Furthermore, behavioural skills emphasise the importance of knowing how to properly wear face masks, techniques of proper hygiene and social distancing. The university's COVID-19 RTT need to use the multiple formal communication channels to create COVID-19 awareness by informing and educating staff and students about COVID-19 symptoms, transmission and prevention measures. Figure below is adapted from Fisher and Fisher (2023); Kaiser *et al.* (2023) outlines the integration of IMB skills model to adopt health behaviour by adhering to COVID-19 protocols.

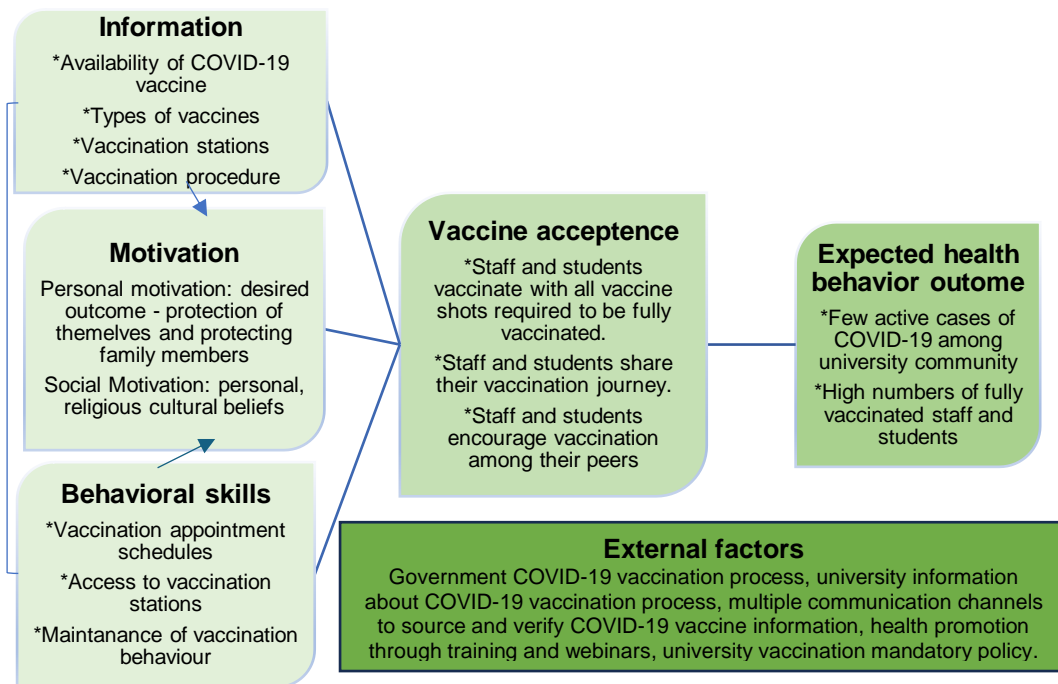


**Figure 1: IMB skills model to adopt health behaviour by adhering to COVID-19 protocols. Source: Fisher and Fisher (2023), Kaiser *et al.* (2023)**

Based on Figure 1 above, the expected health behaviour outcome is less transmission cases of COVID-19 among the university community and minimising the spread of the disease. This

outcome is influenced by the adopted behaviour which is adherence to COVID-19 protocols. To fully adopt the expected health behaviour, staff and students are expected to avoid 'lounging' and social distance in lecture halls, carry and use hand sanitisers and wear face masks and ensure to properly cover mouth and nose. However, staff and students will not be able to fully adopt the health behaviour if they are not informed or educated hence there are external factors that influence the expected health behaviour outcome. The external factors or modifying factors are national COVID-19 protocols, university information about COVID-19 protocols, multiple communication channels to source and verify COVID-19 information, provision of sanitisers and face masks and the university's enforcement of COVID-19 protocols.

Globally, COVID-19 continued to spread which contributed to the high numbers of death cases being recorded daily. The rollout of the COVID-19 vaccine aimed to minimise transmission cases and new infection cases. Therefore, the COVID-19 RTTs had a new task to create COVID-19 acceptance. In the context of this study, the identified targeted health behaviour is vaccine acceptance which will result in fewer active cases of COVID-19 amongst the university community and high numbers of fully vaccinated staff and students. The information construct highlights the information about the availability of COVID-19 vaccines, types of vaccines that staff and students can vaccinate with, vaccination stations and the vaccination procedure. Moreover, the motivation construct emphasizes personal motivation (desired outcome – protection of themselves and protecting family members and social motivation (personal, religious and cultural beliefs). Once staff and students are informed and motivated, they will be expected to possess behavioural skills of knowing how to book for vaccination appointments, capable to access the vaccination stations and maintain the vaccination behaviour. The Figure 2 below demonstrate the integration of the IMB skills model to encourage COVID-19 vaccination among staff and students in a university.



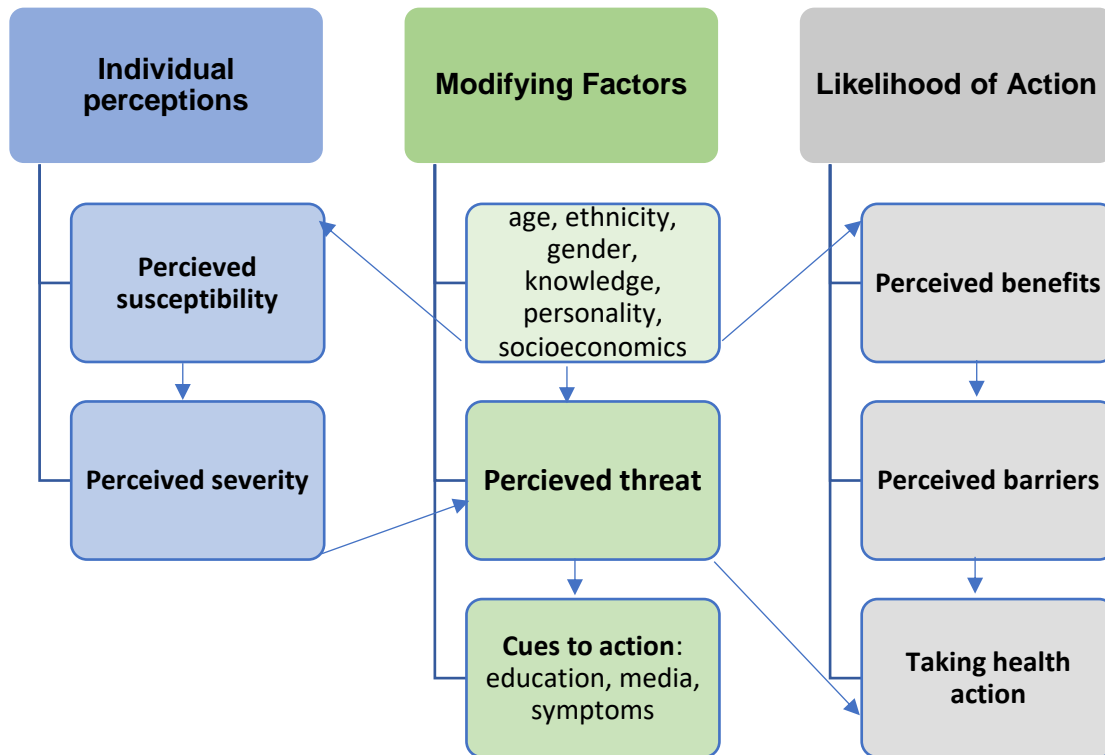
**Figure 2: IMB skills model to adopt health behaviour by accepting COVID-19 vaccine. Source: Fisher and Fisher (2023), Kaiser *et al.* (2023)**

Based on the Figure 2 above, the expected health behaviour outcome is few active cases of COVID-19 amongst the university community and high numbers of fully vaccinated staff and students. This outcome is influenced by vaccine acceptance where staff and students vaccinate with all vaccine shots required to be fully vaccinated, share their vaccination journey and encourage their peers. However, there are external factors or modifying factors that influences the expected health behaviour outcome, which are government COVID-19 vaccination process, university information about COVID-19 vaccination process, multiple communication channels to source and verify COVID-19 vaccine information, health promotion through training and webinars and university vaccination mandatory policy.

#### 2.4. HEALTH BELIEF MODEL

Wong *et al.* (2021); and Suess *et al.* (2022) have defined the HBM as a theoretical framework broadly used to explain health related behaviours in research and enables researchers to understand, explain and predict health promoting behaviours. According to Jose *et al.* (2021); and Shmueli (2021a) the health belief model is part of behaviour change theories which include the theory of planned behaviour, transtheoretical model, social learning theory and diffusion of innovation theory. The concepts of HBM are individual perceptions, modifying factors and likelihood of action (Walrave, Waeterloos and Ponnet 2020). Individual perceptions include perceived susceptibility and perceived severity. The modifying factors include perceived threats and cues to action. The likelihood of action includes perceived benefits,

perceived barriers and taking health care action. See Figure 3 below adapted from Washburn (2020).



**Figure 3: The Health Belief Model. Source: Washburn (2020)**

#### 2.4.1. Concepts of the Health Belief Model

For this researcher study, the concepts of the HBM will be defined and applied in scenarios created by the researcher that are related to health issues and COVID-19 in the context of staff and students. The scenarios will explain and predict health promoting behaviours guided by the concepts of the HBM.

##### 2.4.1.1. *Individuals' perceptions:*

*Perceived susceptibility* refers to an individual diagnosis and calculating possible chances of contracting the disease (Venema and Pfattheicher 2021). Perceived susceptibility emphasises the risk of contracting and transmitting COVID-19 disease among staff and students. The university needs to constantly provide information and statistics on staff and students who have contracted COVID-19 and how the university is affected by the active COVID-19 cases. In these updates, the university can highlight how COVID-19 transmission and symptoms varies among the age group of staff and students. Moreover, the university can identify the most venerable population to contract and transmit COVID-19. The scenarios below elaborate further on staff and students' perception on perceived susceptibility:

**Scenario 1:** *The staff or student is at risk of diabetes. They are likely to explore alternative medication by changing their lifestyle and diet because they can't afford to take action by consulting with the doctor and to pay for the medication. They may believe that alternative medication might work the same as medicine. For them to take action, they need to prove and believe that alternative medication does not work, or it has a negative impact on their health.*

**Scenario 2:** *The staff or student is at risk of contracting COVID-19. They are likely to inquire more information about the disease because they can't take action by social distancing. If the student is at risk of contracting COVID-19, the student will be more likely to explore prevention measures by changing their lifestyle or explore traditional medication as conspiracy theories advocated for such during the pandemic.*

*Perceived severity* refers to individual understanding and perception of how dangerous the disease is (Li *et al.* 2020). The perceived severity of the COVID-19 disease can be emphasised by the university using multiple channels of communication to disseminate information about the likely effects of contracting the COVID-19 disease. Effects such as academic disruptions, long-term health issues, high spread risk of infections, infecting family members and high infection cases among staff and students. Universities can request for consent to share real stories of staff and students whose lives have been affected by COVID-19 in their families and in their communities. Below scenarios elaborate further from the staff and students' perceptions on perceived severity.

**Scenario 1:** *There are sexually transmitted diseases (STDs) awareness campaigns launched in universities, but some students don't practice safe sex. They know that if they are not using protection there might be consequences that may include contracting STDs and pregnancy, but they don't pay much attention to it. The perceived severity might be high for students because contracting STDs and falling pregnant might have dire consequences. When there is an increase of perceived susceptibility and perceived severity students will be more likely to take action.*

**Scenario 2:** *During the COVID-19 outbreak, as a prevention measure at campuses, staff and students were advised to wear masks, sanitize and practice social distancing to minimize the chances of contracting COVID-19. However, students had their own theories on how the disease can be contracted and as a result students were lounging in groups without masks on campus. Students' behaviour was a clear indication of students' perception about how dangerous COVID-19 was at that time hence they failed to adhere to communicated COVID-19 protocols.*

#### 2.4.1.2. *Modifying factors:*

*Cues to Action* are reasons that prompt people to change their behaviour or to take action (Patwary *et al.* 2021). The scenarios below elaborate from the modifying factors on cues to action.

**Scenario 1:** *If staff and students were to lose their loved ones because of COVID-19, they are more inclined to change their behaviour as the disease is closer to home. Moreover, cues may also be feeling sick with some of the symptoms related to COVID-19.*

#### 2.4.1.3. *Likelihood of action:*

*Perceived benefits* are assumptions or decision about changing the current behaviour by adopting a 'better' behaviour (Sheppard and Thomas 2021). It is crucial for the university to inform and educate staff and students about the benefits of adopting health behaviour. In the COVID-19 context, the health behaviour that needs to be adopted is vaccination. The university need to be proactive in issuing information about the benefits of COVID-19 vaccination. Benefits such as reducing the chances of new infections, staff and students will experience milder symptoms and decrease transmission of COVID-19 disease among the university community. Moreover, benefits of vaccination include possible return to normalcy, face to face classes and the continuation of students' social activities if most university community is vaccinated. The scenarios below elaborate further from the likelihood of action on perceived benefits.

**Scenario 1:** *The students may use contraception pills to prevent pregnancy or use condoms to minimize the chances of contracting STDs. Their belief that 'prevention is better than cure' will cause students to take action because of the benefits associated with it.*

**Scenario 2:** *The staff and students may adhere to COVID-19 safety regulations by social distancing and wearing mask or consider vaccination.*

*Perceived barriers* are perceived factors and reasons that might stop individuals to adopt new behaviour (Jose *et al.* 2021). The university need to address perceived barriers and concerns that staff and students may have or raise related to vaccination. In their multiple formal communication channels, the university can provide accurate information of availability of vaccines, access to vaccination stations, safety and effectiveness of the vaccines, address myths and misinformation, debunk conspiracy theories, address concerns related to long term vaccination effect and side effects of all authorised COVID-19 vaccines. Moreover, the university can offer engagement platforms between health experts and the university community to offer their professional opinions and facts about vaccination. The scenarios below elaborate further from the likelihood of action on perceived barriers.

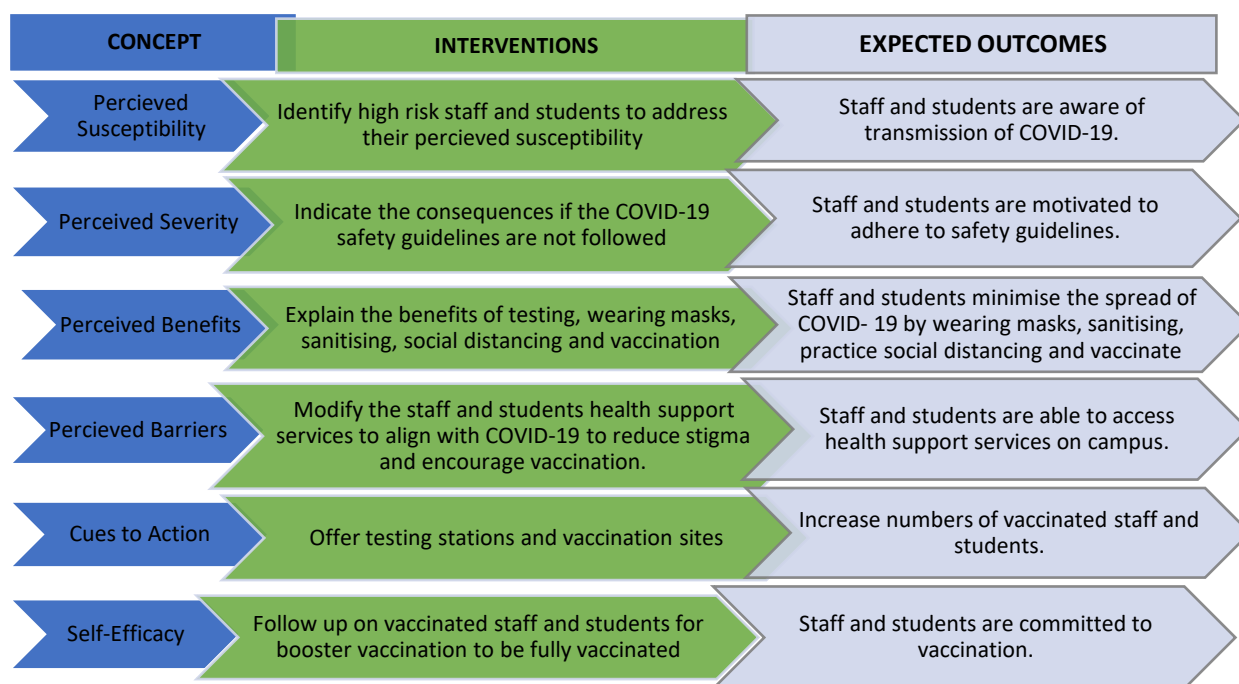
**Scenario 1:** *The students may lack money to purchase masks hence they won't wear it to protect themselves against COVID-19. Furthermore, the living arrangements for students at the residences may also contribute to barriers to adopt social distancing. If there are alternatives provided, e.g.: free masks and individual rooms allocation at residences, students may overcome these barriers and change their behaviour.*

**Taking health action** also refers to **self-efficacy**. It is defined as the individual confidence to take action or belief to change behaviour which can be increased by rewards (Malureanu, Panisoara and Lazar 2021). Information about rewards and incentives, steps to schedule vaccination appointments should be communicated by the university using their multiple formal communication channels and their informal communication channels. University rewards and incentives programmes to encourage vaccination can include offering mobile phone data, medals and handout branded university accessories for fully vaccinated students. Moreover, the university can offer transportation for students who face logistical challenges to reach university vaccination stations. The scenarios below elaborate further from the likelihood of action in taking health action.

**Scenario 1:** *When staff and students are rewarded to change behaviour, they would likely adopt the new behaviour because of the benefits associated with it. For staff and students to take action by following the COVID-19 safety protocols, their behaviour to change can be encouraged by attending webinars and campaigns to learn more about the new behaviour that they need to adopt. Webinars and campaigns may encourage staff and students to take action and to be confident with their decision to adopt new behaviour.*

#### 2.4.2. Application of Health Belief Model for adherence to COVID-19 protocols and vaccine acceptance in a university

To create COVID-19 awareness by ensuring that staff and students adhere to the COVID-19 protocols, the university's COVID-19 RTT need to incorporate concepts of HBM in their vaccine communication. This will assist staff and students by addressing the barriers associated with vaccine acceptance. Figure 4 below is adapted from Almossawi *et al.* (2019) which outlines the integration of HBM theory to create COVID-19 awareness and encourage COVID-19 vaccination among staff and students in a university.



**Figure 4: Health Belief Model for adherence of COVID-19 protocols and vaccine acceptance. Source: Almossawi et al (2019)**

Based on Figure 4 above, to create COVID-19 awareness, the university's COVID-19 RTT can intervene by identifying high risk staff and students and address their perceived susceptibility. To address the perceived severity, the emphasises should be placed on the consequences of not adhering to the COVID-19 protocols. This will motivate staff and students to adhere to safety guidelines for the protection of themselves and their peers. Clear communication about the perceived benefits such as testing for COVID-19, wearing masks, sanitizing, practicing social distancing and vaccinating for COVID-19 will minimise the new transmission and result in few active cases of COVID-19 in a university community. Furthermore, the perceived barriers can be addressed by modifying the staff and students' health support services available on campus to align with COVID-19 for the purpose of reducing the COVID-19 stigma and encourage vaccination. Therefore, staff and students will easily access these services on campus. To increase the number of the vaccinated staff and students, the university needs to offer testing sites and COVID-19 vaccination stations in all campuses. Subsequently, staff and students will accept vaccination and commit to vaccinate with booster shots to be fully vaccinated.

## 2.5. TRANSTHEORETICAL MODEL

The stages of behaviour change communication are: uninformed or unaware, informed or aware, concerned, knowledgeable and skilled, motivation to change, trial change new behaviour and maintenance or adoption of new behaviour (Mason, Rollnick and Butler 2010; Taywade, Chandanshive and Pradhan 2021). These stages have been explored in studies that investigated health behaviour in developing countries, substance abuse treatment, child health, HIV/AIDS, COVID-19, chronic illnesses and other diseases (Briscoe and Aboud 2012; Connors *et al.* 2013; Hashemzadeh *et al.* 2019; Moges *et al.* 2020; Nancy and Dongre 2021; Grant *et al.* 2022). The stages of behaviour change communication are similar to the stages of the Transtheoretical Model (TTM) which suggest that for individuals to change their health behaviour they apply six stages which are pre-contemplation, contemplation, preparation, action, maintenance and termination (Prochaska and Velicer 1997; Emadzadeh and Vakili 2020; Quadri *et al.* 2021). In health education, the TTM is used to explore the health behaviour of individuals and the process that they go through to change or adopt the health behaviour (Hashemzadeh *et al.* 2019). TTM advocates for tailored information and communication to persuade individuals to progress to the next stage of behaviour change (Altmeyer *et al.* 2019; Mulchandani, Alslaity and Orji 2023).

### 2.5.1. COVID-19 Awareness

In the education sector, the TTM can be applied to analyse staff and students' health behaviour related to the existence of COVID-19 disease for the purpose of minimising the spread. In the context of this study, TTM theoretical framework allows researchers to understand health behavior change by identifying stages of staff and students' willingness to adhere to COVID-19 protocols as a protective measure. The stages of TTM are discussed below in the context of COVID-19 awareness for staff and students.

#### 2.5.1.1. Stage 1 – Precontemplation

Stage one of TTM is pre-contemplation, which is when individuals are not considering changing their health behaviour because they are not informed or not aware that the problem exists (Renner and Schwarzer 2003; Ludden and Hekkert 2014; Moqaddas *et al.* 2023). In the context of this study, it is where staff and students are uninformed or not aware that COVID-19 exist. To some extent, staff and students that do not believe COVID-19 can directly affect them can be placed in this stage. To inform, educate and create COVID-19 awareness, the COVID-19 RTT need to communicate the risks of transmission and prevention measures with staff and students.

#### 2.5.1.2. *Stage 2 – Contemplation*

Stage two of TTM is contemplation, which is when individuals are now informed or aware that the problem exists and they are considering changing their health behaviour (Brennan *et al.* 2020; de Freitas *et al.* 2020; Schmidt *et al.* 2022). In the context of this study, staff and students have progressed to this stage because of being informed and aware that COVID-19 exists and may directly affect them. In this stage, they may understand the importance of protecting themselves by adopting prevention measures, however, barriers and concerns may stop them from adhering to COVID-19 protocols. The COVID-19 RTT can conduct a survey to understand and address concerns raised by staff and students. These concerns can be addressed through accurate and clear communication. Moreover, to limit barriers that might hinder staff and students to progress to the next stage, the university can freely provide masks, sanitisers and testing facilities for staff and students.

#### 2.5.1.3. *Stage 3 – Preparation*

Stage three of TTM is preparation, which is when individuals acknowledge that the information communicated about the existing problem affects and applies to them and they grow a desire to evaluate their health behaviour (Harrell *et al.* 2013; de Freitas *et al.* 2020; Moqaddas *et al.* 2023). In the context of this study, this is the stage where staff and students will be preparing to change their health behaviour but not fully adopting prevention measures. In this stage, the university's COVID-19 RTT can support staff and students by ensuring that testing facilities are always operational and mask and sanitisers are available. Furthermore, campus noticeboards can display posters with COVID-19 prevention measures, reminders of sanitising and instructions on how to properly wears masks. These posters can foster a change of health behaviour as they will be visible to staff and students at campuses. This will allow staff and students to progress to the next stage.

#### 2.5.1.4. *Stage 4 – Action*

Stage four of TTM is action, which is when individuals seek more information to be knowledgeable about the existing problem with the purpose of adopting prevention measures (Horwath *et al.* 2013; Yue *et al.* 2021; Mulchandani, Alslaity and Orji 2023). In the context of this study, staff and students may feel motivated to reevaluate their current health behaviour with the aim of changing it so as not be affected by COVID-19. In this stage, staff and students seek prevention measures to protect themselves against COVID-19 by adopting new health behaviour. Moreover, they may start to actively adhere to the COVID-19 protocols by sanitising, wearing masks and testing. The university's COVID-19 RTT can encourage this behaviour by communicating expectations, the importance of compliance and constantly disseminating new COVID-19 information through university's formal communication channels. This will provide staff and students assurance to progress to the next stage.

#### 2.5.1.5. *Stage 5 – Maintenance*

Stage five of TTM is maintenance, which is when individuals have continued with the adopted health behaviour for a certain period (Fallon, Hausenblas and Nigg 2005; Parker *et al.* 2010; Raihan and Cogburn 2020). In the context of this study, staff and students have made it a norm to test for COVID-19, wear mask, sanitising and social distancing. The university's COVID-19 RTT needs to encourage this behaviour by regularly providing updates on the active cases, new COVID-19 information, addressing concerns and challenges related to adhering to the COVID-19 regulations. Furthermore, in this stage the university should acknowledge staff and students' efforts in minimising new infections and transmission. This will strengthen trust among the university community.

#### 2.5.1.6. *Stage 6 – Termination*

Stage six of TTM is termination, which is when individuals are satisfied with their adopted behaviour and are not considering or tempted to return to their old behaviour (Prochaska and Velicer 1997; Mull 2023). In health promotion programmes, this stage is not reached or not considered. In the context of this study, this stage will be applicable if the pandemic is fully controlled, there is no risk of new transmissions and there is treatment. Therefore, the staff and students would go back to live their normal lives before COVID-19 and terminate the new adopted health behaviour. However, when this study was conducted there were still high active cases and few vaccines available of which most population of the case university were hesitant to take. As such, the university's COVID-19 RTT introduced new strategies encouraging vaccination among the university community. This meant re-starting from stage one which is pre-contemplation for the vaccine rollout programmes.

In summary, to create COVID-19 awareness in the education sector, universities can apply the TTM to investigate the preparedness of staff and students to adhere to the COVID-19 protocols. This theoretical framework will assist the university's COVID-19 RTT to develop interventions strategies that align with staff and students' beliefs, concerns and barriers or challenges. Therefore, this will result in the university community's efforts to collectively halt the spread of COVID-19 among staff and students.

#### 2.5.2. COVID-19 Vaccination

In the education sector, the TTM can be applied to analyse staff and students' health behaviour related to the availability of COVID-19 vaccine. Investigating the impact of COVID-19 vaccine communication using TTM allows researchers to identify and understand the stages that staff and students go through to consider vaccination as a protective measure. For this study, vaccination is considered as the adoption of health behaviour. The stages of TTM are discussed below in the context of COVID-19 vaccination for staff and students.

#### *2.5.2.1. Stage 1 – Precontemplation*

Stage one of TTM is pre-contemplation, which is when individuals are not considering changing their health behaviour by vaccinating because they are not informed or not aware that is available. In the context of this study, it is where staff and students are uninformed or not aware that COVID-19 vaccine is available. Therefore, the university's COVID-19 RTT should focus on developing COVID-19 vaccine communication for health education as awareness programmes. The awareness programme will educate staff and students about the types of vaccines that are available, vaccine trials results, effects of the vaccines, pros and cons of vaccinating, provide information of available vaccination stations and how to book vaccination appointments. Furthermore, awareness programmes will address staff and students concerns related to vaccines and vaccination.

#### *2.5.2.2. Stage 2 – Contemplation*

Stage two of TTM is contemplation, which is when individuals are now informed or aware that the vaccines are available and they are considering changing their health behaviour. In the context of this study, staff and students are informed and aware that COVID-19 vaccines are available. In this stage, staff and students may consider vaccination, however, they have concerns and not fully understand how vaccination will benefit them. The university's COVID-19 RTT focus on disseminating vaccine communication, assuring staff and students about vaccination by providing clear and accurate vaccine information. The crucial vaccine information that encourages vaccination is effectiveness of the vaccine, effects of the vaccine, safety of the vaccine and benefits of the vaccine. Moreover, the proposed awareness programmes in stage 3 can serve as the university's vaccination campaigns. These campaigns can include the vaccinated staff and students who will share their personal stories and testimonials to encourage vaccination among the university community.

#### *2.5.2.3. Stage 3 – Preparation*

Stage three of TTM is preparation, which is when individuals have decided to change their health behaviour by taking steps to vaccinate against COVID-19 and fully adopt vaccination as a prevention measure. In the context of this study, staff and students will be researching for vaccination stations available in their proximity and scheduling vaccination appointments. In this stage, staff and students still need assurance from the university that they made the right decision. The COVID-19 vaccine communication disseminated by the university's COVID-19 RTT need to include important vaccination information such as actively operating vaccination stations and vaccination appointment schedules. Furthermore, the university should address barriers of vaccination such as logistic issues that may hinder vaccination of staff and students. In this stage, the university's vaccination campaigns are still needed to assure staff and students' vaccination decisions.

#### 2.5.2.4. *Stage 4 – Action*

Stage four of TTM is action, which is when individuals have fully accepted vaccination as a prevention measure and they have been vaccinated. In the context of this study, staff and students have vaccinated for COVID-19. In this stage, the university's COVID-19 need to focus on reinforcement of vaccination benefits as an assurance strategy. This will motivate and encourage staff and students who are still in a different stage of change as per the stages of TTM. Active university vaccination campaigns need to provide a platform for vaccinated staff and students to share their testimonials for the purpose of building trust and a sense of belonging.

#### 2.5.2.5. *Stage 5 – Maintenance*

Stage five of TTM is maintenance, which is when individuals have vaccinated, however, they still need to be committed in their health behaviour. In the context of this study, staff and students have received their first shot of COVID-19 vaccine, but they still need to receive vaccine booster shots to fully adopt the health behaviour. The university's COVID-19 RTT can encourage the maintenance of this health behaviour by emphasising the importance of being fully vaccinated. University transparency and effective communication is crucial in this stage to make vaccination a norm hence the university's COVID-19 vaccine communication should focus on the benefits of being fully vaccinated, provide reminders to book for booster shots and address concerns about vaccine boosters. In the education sector, the COVID-19 RTT can encourage staff and students to research and publish papers about their vaccination experience as a strategy to fully foster vaccination status among the university community and herd immunity.

#### 2.5.2.6. *Stage 6 – Termination*

Stage six of TTM is termination, which is when individuals are not willing to receive booster shots to be fully vaccinated. In the context of this study, this stage is applicable because of vaccination dropouts. Therefore, the university's COVID-19 RTT need to develop and implement new interventions strategies tailored for staff and students who are hesitant to receive booster shots. These strategies can include feedback and comments from staff and students through consultations and engagement platforms that will allow them to raise their concerns that influences vaccination dropouts. In this stage, the university's vaccination campaigns need to focus on the vaccination dropouts. In the case where staff and students are fully vaccinated (have received COVID-19 vaccine booster shots), this stage will not be applicable.

In summary, to encourage vaccination for COVID-19 in the education sector, universities can apply the TTM to investigate the willingness of staff and students to vaccinate. TTM will assist

the university's COVID-19 RTT to analyse the impact of COVID-19 vaccine communication tailored and targeted for staff and students. The effective COVID-19 vaccine communication and COVID-19 vaccination information is important for all stages of change hence the university needs to develop and implement communications strategies and COVID-19 vaccine communication for each stage. To ensure that COVID-19 vaccine communication reach all staff and students, the university's COVID-19 RTT can primarily use their formal communication channels such as emails and campus noticeboards. Furthermore, to foster vaccination adherence, the university need to consider staff and students beliefs, attitudes and concerns related to COVID-19 vaccination. This can be done through surveys, focus groups and webinars.

## **2.6. THEORIES AND THEIR RELATION TO THE RESEARCH PROBLEM**

This section discusses the importance of applying the three behaviour change communication theoretical frameworks; namely, the Information Motivation Behavioural skills model, the Health Belief Model and the Transtheoretical Model to understand staff and students' choice of vaccination in the education sector. These theories elaborate on the importance of exploring the behaviour of staff and students that needs to be changed, the importance of predicting the health behaviour and the process that staff and students follow to adopt a health behaviour. For the context of this study, concepts of these theories are linked to better understand the research problem. With regards to the identified research problem in Chapter 1, the IMB skills model emphasises that the information construct is a prerequisite in influencing staff and students to change their behaviour. Therefore, to address the research problem, the COVID-19 vaccine communication needs to include clear and accurate information related to the disease.

This is in line with the TTM theory which advocates for information and communication to persuade individuals to proceed to the next stage with the purpose of adopting the health behaviour. TTM theory posits that language barriers and communication barriers may hinder the success of solving the research problem and as a result staff and students are hesitant to progress to the next stage of the theory. That is where the HBM theory become useful as it explains health related behaviour and predict health promoting behaviour for staff and students. The HBM theory offers assurance and motivation to adopt health behaviour through individual perceptions that include perceived susceptibility and perceived severity. To clearly understand the research problem, the HBM individuals' perceptions are integrated with the motivation construct from the IMB skills model as a corequisite in influencing staff and students to adopt health behaviours such as adherence to the COVID-19 protocols and vaccine acceptance.

The motivation construct from the IMB skills model emphasises communication that addresses the individuals' beliefs (cultural, personal and religious) and perceived social norms or social support for adopting a health behaviour. For this study, once the individuals' beliefs are fully understood in COVID-19 vaccine communication, this allows the HBM theory to predict health promoting behaviour. Even though there are HBM theory modifying factors such as perceived threat and cues to action that hinders staff and students to adhere to the COVID-19 protocols and accept vaccination, the behavioural skills construct from the IMB skills model explains what staff and students need to take action. In the context of this study, the behavioural skills constructs emphasise training, workshops and the availability of resources to address the identified research problem. This will limit barriers and increase the likelihood of action as per the HBM theory and as such, staff and students will understand the benefits associated with adhering to the COVID-19 protocols and vaccine acceptance.

## **2.7. CONCLUSION**

Guided by behaviour change communication (BCC), this chapter discussed strategies of behaviour change communication and outlined theories that assist the researcher to explore the identified problem. In the context of this study, the BCC as a model assists the researcher to understand why staff and students behave in a certain way. BCC is a strategy used to encourage people or community to change their behaviour. BCC can be described as the interactive strategy that promotes the appropriate health behaviour. The discussed BCC strategies are multiple communication channels, strategic messaging, messengers, clear information, social norms, staff and students' engagement platforms and loyalty programmes. This study used three theories to explore the identified research problem: namely, Informational Motivational Behavioural skills model (IMB), health belief model (HBM) and the Transtheoretical Model (TTM).

The appropriate health behaviour in this study is adhering to the COVID-19 protocols and vaccinating for COVID-19. In this study, the IMB skills model examines what is known about the behaviour, what motivates staff and students to adopt that behaviour and skills that staff and students need to adopt the behaviour. Therefore, the IMB skills model suggests that staff and students' change of behaviour is determined by information (what is known about their behaviour), their motivation (personal and social) to change or adopt a particular health behaviour and their behavioural skills that they need to have to change or adopt health behaviours.

The HBM explains and predicts individuals' health related behaviour hence the notion that specific health behaviours are influenced by individuals' perceptions. For this study, the HBM suggest that staff and students' health behaviour related to COVID-19 is influenced by their

perceptions of the threat posed by the COVID-19 pandemic and the benefits of vaccination as a prevention measure. Furthermore, the HBM emphasise the importance of acknowledging staff and students' beliefs about the severity of COVID-19, communicating the effectiveness of the vaccine and being proactive in addressing the barriers and benefits of vaccinating. For this study, the TTM suggests that behaviour changes of staff and students transpire over time and develop through various stages. In the context of COVID-19 vaccine communication, the TTM imply that staff and students in a university community may be in different stages of willingness to be vaccinated. These stages can range from unwilling to vaccinate, willing to vaccinate, deciding to vaccinate, getting vaccinated, maintaining the vaccination behaviour and vaccination dropout (*pre-contemplation, contemplation, preparation, action, maintenance and termination*). The next chapter outlines the literature review and conceptual framework of this study.

## CHAPTER 3

### LITERATURE REVIEW

#### 3.1. INTRODUCTION

In Chapter 1, the literature that relates to this study was briefly highlighted. This chapter will critically discuss the literature that draws into Health Communication, Health Education and illustrates the COVID-19 pandemic in a global context. Moreover, the South African COVID-19 response programmes and vaccine rollout programmes will be discussed. This chapter is guided by few concepts that were frequently mentioned in the theoretical framework discussed in the previous chapter. To discuss the literature review that relates to vaccine communication, these topics will be discussed: the Health crisis in South African HEIs, COVID-19 in South African HEIs, Vaccine Communication – A Comprehensive Perspective and Vaccinating for COVID-19 in the education sector. In addition, the conceptual framework will be mapped out and the research gap will be identified.

#### 3.2. OVERVIEW OF COVID-19 AND CRISIS COMMUNICATION

Health communication and health education are the foundation for behaviour change. In the education sector, it is important for policy makers and strategy planners to understand health related behaviour and risk behaviour to come up with effective communication strategies related to a health crisis. Health communication is a key and necessary factor in saving lives during the COVID-19 pandemic (Finset *et al.* 2020). Health communication has been researched for decades, however, the findings of past research may not be suitable in a global COVID-19 pandemic. The evolution of health communication has been influenced by the epidemic of HIV/AIDS in the 80s (Goldstein, MacDonald and Guirguis 2015). In the 21<sup>st</sup> century, the public health communication has changed as communication experts have adopted effective and customised mass communication emphasising the importance of health communication (Kite *et al.* 2016). When there is a health crisis, the government and the public health communication experts are constantly under pressure to come up with strategies, plans and awareness campaigns to frame risk messages to the public.

According to the Constitution of the Republic of South Africa (RSA. 1996), the Department of Health (DoH) is mandated to provide citizens with the professional health care services regardless of their backgrounds. Amongst other things, the DoH needs to inform, create awareness and influence the attitudes, beliefs and behaviour of the public during the pandemic. With the first reported case in Kwazulu-Natal (KZN) Greys Hospital (Arndt *et al.* 2020), the South African government, especially the custodian of health services; the DoH changed their existing communication strategies to include messages about the pandemic. Risk and outrage are the main factors that influences the response of the public based on the

messages disseminated by public health communication experts about the pandemic (Malecki, Keating and Safdar 2021). The studies of Taggart *et al.* (2015); and Malecki, Keating and Safdar (2021) revealed that social media is the most mass media tool used by communication experts to influence the public's understanding about the virus by disseminating informative health messages that can be accessed by users irrespective of their income. However, social media is often associated with spreading fake news and as an engine that fuels panic based on misinformation (Apuke and Omar 2021).

Poor communication and the lack of knowledge can simply be interpreted as public health communication experts failing to communicate and portray the country's leaders or the government as not prepared to respond to the pandemic. This is affirmed by the findings of Costa (2020) which revealed that the public does not have faith in government and perceived the government as unprepared because of lack of communication. Furthermore, Costa (2020) highlighted the contradictions based on the French Institute for Health and Medical Study conducted in 2020 which revealed that South Africa is one of the better equipped countries compared to other African countries to manage COVID-19. Therefore, studies need to be conducted in terms of these challenges in order for the authorities to be prepared (Umvilighozo *et al.* 2020).

It is vital for government departments or sectors to implement communication strategies that will inform, create awareness and influence attitude, beliefs and behaviour. One of the main objectives of public health communication experts is designing "effective messages that can persuade the target audience to change their attitudes or behaviours relevant to a range of health issues" (Shen, Sheer and Li 2015: 105). The messages designed by public health communication experts can be disseminated in the form of intervention strategies or response programmes. The aim of response programmes and intervention strategies is to convey risk messages and information that can be easily accessible and consumed by the public regardless of their education levels, location, language and age (Adam, Bärnighausen and McMahon 2020). Failing and delaying to communicate with the public can cause fear, misinformation and doubts which could cause unfounded theories that can aggravate uncertainty and paranoia (Adam, Bärnighausen and McMahon 2020).

Crises and risks are both likely to create uncertainty as they are unforeseen. In a public health communication context, crisis communication and risk communication aim to limit and lessen harm during a pandemic or health crisis (Lachlan *et al.* 2016). The difference between crisis communication and risk communication as defined by Veil, Buehner and Palenchar (2011) is that crisis communication approach is mainly about responding to the public's needs by providing information, whilst risk communication's approach is solely on persuading the public

concerning their capability to curb the risk. Communication experts from different sectors during the pandemic relied on mass communication to constantly provide information for their stakeholders. The mass media played a vital role to convey information, messages and update the public about the country's communication strategies and response programmes related to the pandemic.

Mass media has a wide range of tools that the public can choose from to access information, from digital media (social media, websites), print media (newspapers and magazines) to broadcast media (TV and radio). These tools can be used as an interactive platform between the public and public health communication experts that provide updates about the crisis (Lwin *et al.* 2018). In a large scale, mass media has an impact on people's lives on a daily basis. Often mass media is taken for granted; however, it does not exist only to be a watchdog and a gatekeeper, it is a middleman with an aim to provide factual and critical information by delivering important messages that clarify issues and influence peoples' opinions. Media is an invariable component of the social and cultural landscape in South Africa and directly or indirectly provides messages that shape our perceptions (Hobbs 2020). Various researchers have conducted studies exploring crisis management, however, there is gap to be investigated which deals with crisis management in HIEs amidst a global pandemic (Coombs 2015; Calonge *et al.* 2021).

### **3.3. HEALTH CRISIS IN SOUTH AFRICAN HIGHER EDUCATION INSTITUTIONS**

For decades, public health crises in South African HEIs have been influenced by inadequate healthcare services, political unrest and socio-economic inequality (Kon and Lackan 2008; Maphumulo and Bhengu 2019; Chetty 2021). The history of inequality in the South African education sector stems from apartheid and the transition to democracy. Apartheid impacted the availability and equal access to healthcare services and as a result staff and students are still affected by these issues. Moreover, mental health issues, gender-based violence (GBV), COVID-19 and HIV/AIDS are some of the health crises that impact South African HEIs. The HIV/AIDS impacted most African countries in the early 90s, including South Africa. The literature indicates that during the COVID-19 outbreak people in Southern Africa who were living with HIV/AIDS had a higher risk of contracting COVID-19 as these disease were concurrent pandemics (Gatechompol *et al.* 2021; Van Wyngaard and Whiteside 2021). Since the early 2000s, HEIs have been constantly under pressure to educate, inform and launch HIV/AIDS campaigns in partnership with their stakeholders.

The history of South African health communication started in the 1990s with HIV/AIDS through the launching of campaigns that were broadcast by the popular television dramas, e.g.: Soul City as an edutainment prevention in South African television (Tufte 2002). Universities have

a social responsibility to conduct research studies that may contribute to the awareness of the existence of HIV/AIDS and to protect the health of staff and students (Nchabeleng 2018). The high infection cases of HIV/AIDS among university students indicates that HEIs are failing in terms of influencing students' health behaviour and promoting a healthy lifestyle (Mthembu, Maharaj and Rademeyer 2019). The high rates of HIV/AIDS in South Africa pose a threat to staff and students in HEIs. Scholars have conducted studies investigating the impact of HIV/AIDS in the education sector focusing on students. The studies by Inungu *et al.* (2009); Maimaiti *et al.* (2010); Haroun *et al.* (2016); Nubed and Akoachere (2016); and Dadipoor, Ghaffari and Safari-Moradabadi (2020) have assessed attitudes, knowledge and practices related to HIV/AIDS among university students and senior school students in Cameroon, Iran, USA, UAE and Xinjiang. The findings of these studies emphasised the need for interventions to create a supportive environment and address the knowledge gap for affected students. Other researchers assessed the experiences of higher education students living with HIV/AIDS in South African HEIs such as the University of Fort Hare (Kalipa 2014) investigated how HIV positive students managed their condition and their experiences in a university environment. They highlighted the importance of holistic health support services in the education sector.

University students' mental health issues stem from the challenges faced by students such as financial issues, social challenges and transitioning from high school education to higher learning education (Son *et al.* 2020; Sheldon *et al.* 2021; Wang *et al.* 2022). These challenges contribute to psychological distress, anxiety, high levels of stress and dropouts of students. Various studies have explored the impact of the COVID-19 pandemic on students' mental health and emphasized the need for active health initiatives focusing on students' well-being (Copeland *et al.* 2021; Liu *et al.* 2022). Furthermore, the need of promoting mental health support services in universities is emphasised by Salimi *et al.* (2023). Nevertheless, students' mental issues are a tip of an iceberg in South African universities where researchers have found that female students are affected by safety issues, sexual violence and GBV (Ajayi, Mudefi and Owolabi 2021; Mutinta 2022).

Furthermore, safety issues and GBV, which is faced by female university students has been a cause for concern in the South African education sector (Enaifoghe *et al.* 2021; Mutinta 2022). The literature indicates that there is a lack of interventions strategies to address challenges faced by female university students. The findings of the study conducted by Mutinta (2022: 2) from four South African public universities in the Eastern Cape revealed that most female university students "were survivors of gender-based violence at the university". Therefore, Mutinta (2022) emphasised that universities and other parties associated with universities need to develop interventions and policies with the aim of protecting female

students and raise awareness of GBV incidents and their causes. The findings of the study conducted by Mahabeer (2021) elaborates on the lack of active and accessible health care services to ensure the well-being of university students. As a result, a first year student that had a GBV incident in one of South African universities was disappointed by the disciplinary process and the outcome regarding the reported incident (Mahabeer 2021). In 2020, students' health issues especially mental health was exacerbated by the COVID-19 pandemic (Rwafa-Ponela *et al.* 2022; Bantjes *et al.* 2023; Salimi *et al.* 2023)

The operational status of HEIs in South Africa is influenced by different factors, such as globalization, politics, background of staff and students, economy and pandemics. Globally, in 2019, the HEIs were affected by the COVID-19 pandemic which propelled HEIs to develop "safety" frameworks by shutting down campuses and enforcing measures of social distancing (Toquero 2020). The impact of COVID-19 forced HEIs to suspend classes, changes in the academic calendar, transitioning to online teaching and learning, proposing COVID-19 response and prevention strategies, adopting vaccination policies and proposing alternatives to teaching and learning to support staff and students. HEIs have a duty to respond to public health crisis by developing communication strategies that are aligned with governmental frameworks and response programmes (Al-Youbi *et al.* 2020; El Masri and Sabzalieva 2020).

The literature indicates that South African HEIs are somehow affected by changes in government, public health crisis, economy, politics and globalisation (Abdool Karim, Kruger and Hofman 2020; Yaya, Otu and Labonté 2020; Le Grange 2021). Furthermore, there are complex issues that impacts the state of the education sector, such as HIV/AIDS, TB, GBV, alcohol abuse, poverty, unemployment, low literacy rates, social injustice, politics and inequality (Motsa 2021). These issues are interlinked with challenges faced by South African HEIs which includes institutions operations, staff and students support services, funding and political issues (Naidoo and Cartwright 2020; Mhlanga, Denhere and Moloji 2022).

Nonetheless, South Africa HEIs are constantly under pressure to respond to health crisis that impact the lives of their stakeholders. While the global health crisis impacts the operations of HEIs; the safety, health behaviour, attitudes and beliefs of staff and students remain challenging for most HEIs (Aristovnik *et al.* 2020; Azman and Abdullah 2021). This is a result of different background and the lack of awareness and misinformation (Balakrishnan, Ng and Rahim 2021; Superio *et al.* 2021). This necessitates research on the effectiveness of health communication in an educational environment (Chesser, Drassen Ham and Keene Woods 2020). Managing communication during a crisis can be very challenging, especially in the education sector. Globally, the COVID-19 pandemic created challenges for HEIs and affected how they operate. Dr. Blade Nzimande instructed universities in South Africa to prepare for a

year of COVID-19 restrictions in 2021 pending the vaccination programmes that was underway (Writer 2021). He further urged the management of the South African HEIs to base their plans for the 2021 academic year on the national lockdown rules framework (News 2021a). Furthermore, he advised the leaders of South African HEIs to take into consideration the DHET directions as published in the gazette number 669 (Republic of South Africa 2021). During the global crises, the existing institutions communication strategies can be altered or incorporated to risk disclosures and organisational plans (Carnegie, Guthrie and Martin-Sardesai 2021). These communication strategies can factor in issues related to staff and student's wellbeing (Burns, Dagnall and Holt 2020).

The HEIs can respond to global health crisis by developing strategies and creating clear communication structures that will provide clear information and strengthen the communication between the institution and stakeholders particularly staff and students (Coombs 2015; Wang 2019; Wu, Connors and Everly Jr 2020). Moreover, HEIs can choose primary formal communication channels to convey clear information related to the pandemic that might influence the attitudes, beliefs and perceptions of staff and students (Yu *et al.* 2020). However, this does not mean that the existing intervention strategies implemented pre-pandemic through health communication, health education and health promotion need to be neglected.

### 3.3.1. Health communication, health education and health promotion in South African universities

Universities use strategic communication tools for their awareness campaigns and response programmes to disseminate information and important messages to their stakeholders (Farinloye *et al.* 2020). In a health crisis, it is crucial for HEIs to develop and implement effective communication strategies that will positively influence the attitudes, beliefs and health behaviour of their stakeholders at large, particularly staff and students. The availability of support services and health services for staff and students is crucial for HEIs. In the education sector, the state of access to health care, support services and medical treatment is dependent on the response strategies developed and employed by universities. Most universities in South Africa have implemented health communication, health education and health promotion programmes in their health initiatives to address health challenges affecting their students and to provide support. Students in South African universities are often exposed to dangerous health behavioural threats such as the lack of physical activities, smoking and alcohol consumption (Pengpid and Peltzer 2013; Gresse, Steenkamp and Pietersen 2015; Thendele 2018; Nyandu and Ross 2020). Nevertheless, students face health risks on and off-campus such as alcohol abuse, sexually transmitted diseases and HIV/AIDS (Kheswa and Hoho 2017; Mokgatle, Madiba and Cele 2021; Murwira *et al.* 2021; Chuene and Kgarose 2023).

Therefore, South African universities provide students health support services through health education and health promotion to implement intervention strategies that aim to reduce the risk of students affected by alcohol abuse, STDs and HIV/AIDS (Volks 2004; Musakwa *et al.* 2018; Moagi, Mulaudzi and Van Der Wath 2020). The promotion of living a healthy lifestyle is integrated into student health promotion campaigns. The health support services in South African universities are designed to promote behaviour change by encouraging HIV testing, HPV testing through cervical cancer screening, circumcision, TB testing, STDs testing and contraceptives to ensure students graduates alive (Gobind and Ukpere 2015; Mantell *et al.* 2015; Musakwa *et al.* 2018; Eche and Vermaak 2022). Furthermore, TB, STDs and HIV/AIDS are some of the diseases that have been globally identified with high infections rates among university students (Bannour *et al.* 2020; Mansor, Ahmad and Rahman 2020; Mwangi *et al.* 2022). During the outbreak of COVID-19, South African citizens were still struggling with new infection cases of HIV/AIDS (Fagbadebo and Dorasamy 2022). Since the outbreak of COVID-19, people living with HIV/AIDS feel neglected because research work of finding the cure and various trials were put on halt (NEWS 2021b).

In HEIs other health promotion campaigns often focus on food insecurity among students and counselling services which aims to promote holistic student development (Naidoo and Cartwright 2018; Sabi *et al.* 2021). Furthermore, health promotion campaigns in universities are regarded as health intervention measures as they serve to inform and educate students about health issues and influence the adoption of health behaviours. Students who are equipped with skills and are knowledgeable about health issues contribute to safety and healthier environments on campus. The substantial changes in universities health support services are notable in South African HEIs as there are awareness campaigns or programmes, health interventions strategies and more improved health programmes (Mkhize and Maharaj 2021). The case university (DUT) has effectively launched awareness campaigns related to HIV/AIDS for the university community. Over the years, DUTs HIV/AIDS campaigns are Voluntary Counselling and Testing, The First things First Campaign, Silent Protest, Graduate Alive, Candlelight memorial and Day of Pride (Nchabeleng 2018). Consequently, the outbreak of COVID-19 severely impacted South African Universities and as such health practitioners had to develop and implement response strategies.

### **3.4. COVID-19 IN SOUTH AFRICAN HIGHER EDUCATION INSTITUTIONS**

The COVID-19 pandemic impacted a variety of sectors including the education sector. In order to flatten the curve and minimise infections, lockdown was implemented as a public care strategy. In South Africa, the national lockdown for 21 days was announced by President Cyril Ramaphosa starting midnight on the 26 March 2020 to 30 April 2020 after 402 cases of infections were confirmed (Reuters 2020). The impact of COVID-19 in HEIs propelled the

institutions to relook at their business model, attend to challenges related to communication, marketing and public relations strategies and develop response programmes to deal with the global health crisis (Calonge *et al.* 2021). One of the main factors that has impacted the HEIs status is globalisation, which influences the challenges that the institutions face internally. For HEIs in a global context, the COVID-19 pandemic created challenges and changes on how they operate, putting new and uncontrollable pressure on staff and students (Green *et al.* 2020). Based on this, it is important for HEIs to be prepared for external crises by planning and implementing the response strategies to calm, mitigate fear, inform by creating awareness and influence their staff and students' attitudes, beliefs and perceptions about the pandemic (Christian, Purwanto and Wibowo 2020; Saavedra-Alamillas *et al.* 2020). Furthermore, preparedness is the foundation of a response programme during a crisis (Nchabeleng 2018).

The impact of the COVID-19 pandemic has forced the South African HEIs to develop and implement emergency plans to respond to the crisis by making drastic changes which may affect their stakeholders, the financial stability and the business model (Calonge *et al.* 2021; Xie *et al.* 2021). For the education sector, the COVID-19 pandemic posed as a great challenge as the institutions of learning had to change their academic calendar because of lockdown. The South African education sector is one of the biggest sectors impacted by COVID-19 and as a result HEIs faced challenges in adapting to the global pandemic (Mncube, Mutongoza and Olawale 2021; Alex 2022). South African HEIs and education discontinued contact classes which instilled fear for losing the 2020 academic year (Pokhrel and Chhetri 2021).

South African universities transitioned from the traditional teaching and learning to online platforms to adhere to the COVID-19 regulations such as lockdown and social distancing (Maphalala and Ajani 2023). This transition affected mostly South African university students, especially those from disadvantaged backgrounds (Hlatshwayo 2022). Since universities closed campuses and students' accommodation, students did not have the necessary resources to attend lectures and submit assessments in university online platforms (Marongwe and Garidzirai 2021; Mdiniso *et al.* 2022). The findings of the study conducted by Mdiniso *et al.* (2022) in historically black South African universities revealed that staff and students struggled with adapting to online teaching and learning due to limited resources, the lack of data to access the internet and the lack of skills in online teaching and learning.

Furthermore, poor network connectivity and uncondusive home environments affected most South African university students who reside in rural areas (Matarirano, Gqokonqana and Yeboah 2021; Ajani 2023). During the lockdown, students were unable to access libraries, conduct research and to submit their assessments on time which significantly emphasised the gross inequalities faced by South African university students from poor and rural communities

(Landa, Zhou and Marongwe 2021). The COVID-19 has impacted a variety of aspects of students' lives including: transitioning from attending classes on campus to online lectures, academic work, changes in social and academic lives, home schooling, conducive environment to study, load-shedding, connectivity issues, technological barriers and the role of the institutions (Aristovnik *et al.* 2020); Toquero 2020); (Rashid and Yadav 2020); (Burki 2020); (Marinoni, Van't Land and Jensen 2020).

The impact of the COVID-19 pandemic in South African universities exacerbated mental health issues of university staff and students (Olawale *et al.* 2021; Visser and Law-van Wyk 2021). However, universities such as Stellenbosch University (SU) offered their community virtual counselling services to ensure continuous support during the COVID-19 pandemic (Dunn-Coetzee *et al.* 2021). The outbreak of the pandemic has led South African HEIs to relook at their health policies and develop new health response strategies and work on creating a safety environment for their stakeholders (van Schalkwyk 2021; Wangenge-Ouma and Kupe 2022).

Despite the efforts by the WHO to mitigate the spread of the virus, the challenge is that there are various factors that contributes to the spread of COVID-19. Challenges such as misinformation, lack of awareness and limited resources contributes to higher infection rates. In an effort to minimise the spread and making awareness about COVID-19 to their stakeholders, the HEIs formed COVID-19 RTT with the aim of developing communication strategies as a response strategy (Zikargae 2022). Communication strategies are multifaceted, a plan to disseminate messages to your target audience and the blueprint that a company uses to meet communication objectives with their stakeholders (Mheidly and Fares 2020b; Bhasin 2021). Developing and disseminating accurate information and messages about COVID-19 is crucial in the education sector (Chisita and Chizoma 2021). Consequently, COVID-19 awareness campaigns are faced with challenges of fake news and misinformation (Petratos 2021).

Since the outbreak of COVID-19, social media has been flooded with fake news and misinformation leading the to the WHO and government leaders to "fight the pandemic as well as the infodemic" (Brindha, Jayaseelan and Kadeswara 2020: 586). The misinformation about the COVID-19 pandemic and COVID-19 vaccines started conspiracy theories and anti-vaccine propaganda which could cost human lives (Barua *et al.* 2020: 2). HEIs need to provide staff and students with accurate information about COVID-19 to be informed, educated and to make informed choices with regards to curbing the infections (Crawford *et al.* 2020; Cuaton 2020; Marinoni, Van't Land and Jensen 2020). Although there are studies on the impact of misinformation and fake news, they are limited in a HEIs, especially the University of Technology context.

### 3.4.1. COVID-19 misinformation

Government authorities used and relied on mass communication and mass media to distribute COVID-19 information to the public (Udo 2022). The diversity of both mass communication and mass media allows the public health communication experts to send messages to the audience out of reach (Stellefson *et al.* 2020). Furthermore, the mass media has a vital role to inform, influence public perceptions and changing public opinions (Moreno, Fuentes Lara and Navarro 2020; Zhang and Guo 2021). The mass media plays an important role on how staff and students are perceived from different HEIs. In a modernised world, the HEIs use a variety of mass communication, including internal formal communication channels such as Email, Ms Teams, statements and Digital media (Website, Facebook, Instagram and Twitter), Educational campaign posters and billboards, Virtual events or webinars and lectures to communicate with their stakeholders (Olaimat *et al.* 2020; Tran *et al.* 2020). Staff and students have access to and use a variety of social media platforms hence it is crucial for HEIs to be more proactive to post educational and informative COVID-19 vaccine information across all platforms. According to Peng *et al.* (2020) most active accounts on social media are managed by students hence their behaviours and perceptions about COVID-19 disease can increase the infection rates and influence vaccine hesitancy.

Studies by Glasdam and Stjernswärd (2020); Mheidly and Fares (2020a); and Jamshed (2021) have indicated that social media platforms are regarded as “not reliable” platforms to disseminate crucial information as they are linked to many issues such as bullying, misinformation or fake news and conspiracy theories. The issue of misinformation during a health crisis can cause a major impact in public health (Howard *et al.* 2019; Nguyen and Catalan-Matamoros 2020). Notably so, the dissemination of COVID-19 information via social media platforms in South African HEIs has been questionable as they have been cases of fake accounts posing as universities posting fake information (Bahige 2019). With the global rollout of COVID-19 vaccine, the communication health experts now have two responsibilities which is to debunk misinformation and implement COVID-19 vaccination strategies to influence vaccine decisions. Therefore, the COVID-19 Task Teams and communication health experts need to develop and implement effective COVID-19 vaccine communication that aims to impact vaccine decisions.

### 3.5. VACCINE COMMUNICATION – A COMPREHENSIVE PERSPECTIVE

In the past, there were 14 diseases that required a vaccination to curb them; namely; polio, tetanus, flu (influenza), hepatitis B, hepatitis A, rubella, haemophilus influenza, measles, whooping cough (pertussis), pneumococcal disease, rotavirus, mumps, chickenpox and diphtheria (CDC 2022). Often vaccination is unwelcomed hence there are anti-vaccination campaigns and infodemics on social media (Erdem 2022). South African various sectors were

affected by the global health crisis which posed a new challenge to educate, inform people about COVID-19 and COVID-19 vaccination (Davies 2020; Mukandavire *et al.* 2020). Over the years, vaccination has declined for diseases such as influenza and HPV (Kornides, McRee and Gilkey 2018; Okoli *et al.* 2021). Vaccination requires delivery strategies and effective leadership to manage the possible challenges associated with it (Weintraub *et al.* 2021).

Vaccination objectives can be achieved through proper implementation of vaccine rollout programmes and vaccine communication. Vaccine communication aims to disseminate vaccine informative messages to the public (Willis *et al.* 2013). Vaccine communication in the education sector requires South African HEIs to customise their vaccine communication strategies to suit their stakeholders by ensuring that the messages disseminated are understood, factual and practical. It is vital for health experts to effectively communicate and update patients, the public, stakeholders, leaders and policy makers about the developments of vaccines, the availability of vaccines and the effectiveness of vaccines through vaccine communication (Motta *et al.* 2021; Petersen *et al.* 2021; Rzymiski *et al.* 2021). During a health crisis, vaccine communication fosters trust, promotes vaccination acceptance, address concerns and ensures the proper implementation of vaccine rollout programmes (Chou and Budenz 2020; Andigema and Cyrielle 2024).

Furthermore, clear vaccine communication debunk myths, provides accurate vaccine information and minimises vaccine hesitancy (Bryan, Gunningham and Moreno 2018; Hansen, Baiju and Gabarron 2023; Whitehead *et al.* 2023). Effective vaccine communication assist patients and the public to take informed decisions about vaccination and increases vaccination awareness (Willis *et al.* 2013; Zheng, Jiang and Wu 2022). The main challenges of effective vaccination are conspiracy theories, the lack of trust in government and health experts, unclear information and contrasting messages, misinformation, myths, uncertainties related to the diseases, perceived risks, cultural and religious beliefs, unfounded disadvantages and the long-term effects of vaccination (Jennings *et al.* 2021; Petersen *et al.* 2021; Bajos *et al.* 2022; Whitehead *et al.* 2023). To overcome these challenges, health experts need to provide support and evidence-based vaccine information through vaccine communication to address vaccine hesitancy. Vaccine hesitancy poses a threat to public health because of health inequalities that stems from cultural differences and the lack of access to education.

Therefore, accurate vaccine communication needs to include diverse and simple language, tailored messages for specific target audiences and clear information to inform and educate the public (Pența and Băban 2018; Caballero, Leath and Staton 2023). To combat vaccine hesitancy, vaccine communication can be enhanced by utilising various strategies such as collaborations with community leaders, traditional leaders, influential people, health experts,

advocacy groups, community organisations and government (Oyo-lta *et al.* 2021; Yuen 2022; Soni *et al.* 2023). These strategies can be effective through tailored messages disseminated on social media platforms, official websites and on various news platforms that are easily accessible to the targeted audience. Notably so, stakeholders need to be equipped with evidence-based information and communication skills to enhance vaccine communication.

Effective and clear vaccine communication strategies are vital to encourage vaccination during a pandemic. The past studies have highlighted the importance of vaccinating for health and safety of the people (Reveal 2017; Machado *et al.* 2022; Boëlle and Valdano 2024). The findings of a study conducted by Bish *et al.* (2011) provided insights related to the factors influencing vaccination in 2009 for the influenza pandemic. Their systematic review study aimed “to examine the psychological and demographic factors associated with uptake of vaccination during the 2009 pandemic” (Bish *et al.* 2011: 6472). Their results revealed that factors associated with vaccinating for H1N1 influenza were but not limited to social pressure, safety and vaccine side effects, believing to be at risk of contracting the disease, sourcing vaccine information from official health platforms and being vaccinated in the past (Bish *et al.* 2011). Moreover, Bish *et al.* (2011) recommended research to be conducted on interventions to increase vaccination for influenza before a pandemic occurs may be an effective strategy. Their recommendations to develop and implement intervention strategies to increase vaccination rates can be adopted in a university community to encourage vaccination for COVID-19.

### **3.6. VACCINATING FOR COVID-19 IN THE EDUCATION SECTOR**

The outbreak of COVID-19 had a substantial impact in different sectors (Mahmud *et al.* 2021). The pandemic mostly affected the education sector as this sector has a variety of stakeholders from different backgrounds with diverse beliefs and attitudes (Grooms and Childs 2021; Fenitra *et al.* 2022). The cases of COVID-19 in HEIs impacted the operations, policies and the status of the institutions among their stakeholders; mainly staff and students (Mncube, Mutongoza and Olawale 2021; Elhajjar and Yacoub 2022). With social distancing as one of the safety restrictions, the impact of the pandemic in HEIs goes beyond what is happening in the lecture rooms, but influences the circle of networking for postgraduate students who may want to join the exchange programmes from universities abroad (Mogaji and Jain 2020; Mustafa 2020). Preparedness indicates the institutions’ commitment to protect their staff and students by reshaping teaching and learning in traditional ways by moving to online learning with no or limited training involved (Green *et al.* 2020; Ifijeh and Yusuf 2020). As a result of the rapid transitioning to online learning, the challenges such as home conducive learning environment for online learning, inadequate internet facilities, provision of data and equipment contributed to the impact caused by the pandemic in HEIs (Green *et al.* 2020; Halaweh 2020;

Mogaji and Jain 2020). Based on this, Mogaji and Jain (2020) recommended the need to conduct research related to the impact of the pandemic in HEIs, examining the research, economic and planning aspects. Some researchers believe that COVID-19 vaccines can end the pandemic (Karafillakis and Larson 2017; Sallam 2021). Vaccination in HEIs is a complex issue as they have a variety of stakeholders with different beliefs, cultures, norms and traditions. In the past, vaccination has not been highly advocated in HEIs as the diseases that required vaccination did not directly impact the university operations. However, the HIV/AIDS cases identified in HEIs have propelled universities to address health crisis by creating interventions and providing health support services for staff and students (Haffejee *et al.* 2018; Hossain *et al.* 2022). Prevention strategies and health communication were used as public health prevention measures to control and minimise the spread of the COVID-19 pandemic (Anjorin 2020).

In 2020, DUT introduced Higher Health: HealthCheck as a mandatory self-risk assessment tool for staff and students to track their COVID-19 symptoms before accessing the campus (DUT 2020b). To gain campus access, staff and students were asked to show their Higher Health: HealthCheck results at the entrance and check temperature to be granted access. The council of the university approved a vaccination policy in December 2021. This policy was called “*Policy choices on vaccination of staff and students*”. (DUT 2021c). DUT communiques referred to this policy as the Three-Choices Vaccination Policy in their communique and the policy was effected in January 2022 (DUT 2021c). The policy advocated for three principles: rights and privileges, responsibilities and obligations and consequences of individual choices. This policy was suspended in 2022 after the announcement of resumption of contact classes in all campuses.

### 3.6.1. COVID-19 Vaccine Rollout

One of the interventions to mitigate the spread of COVID-19 and its impact on the social and economic factors is the vaccine rollout programme (Loomba *et al.* 2021). According to Loomba *et al.* (2021) online misinformation of the vaccine impacts the success of the vaccine rollout programme. Anti-vaccination campaigns were active during the global COVID-19 vaccination rollout. Therefore, there is a need to conduct research to clarify how online fake news and misinformation of the COVID-19 vaccine impacts the success of the COVID-19 vaccine rollout programme. Moreover, there are health experts who use social media as an interactive and easily accessible platform to share health messages. To correct the COVID-19 vaccine misinformation that influences vaccine hesitancy, researchers (Hotez *et al.* 2021:2) recommended that “government leaders should prioritise evidence-driven communication strategies in their COVID-19 vaccine programmes, while healthcare providers create

awareness by responding to public concerns, and counter unfounded claims by those seeking to undermine public confidence in vaccines”.

In South Africa, the COVID-19 vaccine rollout programme started in February 2021 with adults aged 50 and over (Gavi 2023). However, during the first COVID-19 vaccine rollout the KZN government realised that there is more vaccination hesitancy among South African citizens than anticipated (Mthethwa 2021). The then Premier of KZN, Mr. Sihle Zikalala urged South African citizens to stop spreading conspiracy theories about COVID-19 and the COVID-19 vaccines (Nkanjeni 2021). In KZN, the community health care workers, the KZN Health MEC Ms. Nomagugu Simelane-Zulu and the KZN Premier raised their concerns about the COVID-19 stigma, misconception about the virus and emphasised that a lot more can be done to create awareness and educate South African citizens about the COVID-19 disease and the COVID-19 vaccines (Xolo 2020). Mr. Zikalala dismissed the claims such as the link of COVID-19 with 5G towers, the belief that once you have been admitted to a hospital because of COVID-19 you die and that only traditional medicine can cure COVID-19 (Mdletshe 2020; Writer 2020). Furthermore, the community health care workers in KZN stated that the stigma about the COVID-19 echoes those from the TB and HIV/AIDS which have always been there and have never been fully addressed (Xolo 2020).

The success of the vaccine rollout programme in HEIs is dependent on the COVID-19 vaccine communication strategies developed and implemented by universities. Over and above the government’s intervention to counter fake news and misinformation, various sectors including the education sector need to play their role as they have a variety of the population that fits the criteria of the COVID-19 vaccine rollout programmes. Since the advent of the COVID-19 pandemic, DUTs COVID-19 campaigns were COVID-19 JAB at DUT, #VaccinationThursday, Vaccine hesitancy training and weekly updates (Sukazi 2021). DUT formed its COVID-19 RTT that developed and implemented the DUT COVID-19 response strategies and for the safety of the university community the departments needed to endorse these response strategies as well.

DUT COVID-19 RTT forged partnerships with the KZN DoH and eThekweni Municipality to launch the DUT vaccination campaign as a way of promoting the health and safety of the university community (Sukazi 2021). This partnership resulted in the launch of a temporary (operational for one week) vaccination centre from 08 to 15 September 2021 at Ritson Campus in Durban (DUT 2021b; Zwane 2021). From 20 to 30 September 2021, other temporary vaccination centres were set up at Indumiso Campus in Pietermaritzburg where staff were encouraged to vaccinate with booster shots DUT 2021d). To increase the number of vaccinated staff and students, in January 2022 DUT launched their fully operational

vaccination centre in the Hotel School at Ritson Campus (DUT 2022b). Thereafter, in a two-week daily vaccination campaign, staff and students were encouraged to book their vaccination at Isolempilo Clinic located at the Steve Biko Campus from 24 January 2022 to 04 February 2022. DUT's Isolempilo Clinic offered both Pfizer and Johnson & Johnson vaccines for staff and students. A week before the launch of DUT's two-week long vaccination campaign, the DUT COVID-19 Task Team had #VaccinationThursday campaigns at the Steve Biko Campus in Durban. The #VaccinationThursday was positively received by the university community (Durban University of Technology 2022a). The DUT's COVID-19 RTT has hosted a series of virtual seminars, educating staff and students about the importance and effectiveness of the COVID-19 vaccines (Zuma 2021). These virtual seminars were one of the strategies that the COVID-19 Task Team used to influence vaccine decision making.

In 2021, the KZN Department of Education (DoE) encouraged their employees to be vaccinated and emphasised the importance of taking the vaccines even though there are educators who are hesitant and cited reasons such as personal beliefs and fake news that influenced their vaccination hesitancy (Madonsela 2021; Singh 2021). This necessitated the need to explore strategies that can be implemented to address personal beliefs, public attitudes and public perceptions towards COVID-19.

### 3.6.2. Public Attitude and Perceptions Towards COVID-19 Vaccine Acceptance

The most significant factors that influences the acceptance of COVID-19 vaccine are public attitudes and public perceptions towards vaccination hence it is crucial for public health communication experts to understand the factors that influence public attitudes and perceptions. This will assist public health communication to develop and implement customised communication strategies that influence the public sphere and encourage vaccination. A study conducted in China found that China had higher COVID-19 acceptance rate when compared with Russia (Lazarus *et al.* 2021). However, globally, COVID-19 vaccine acceptance differs from country to country. According to Lazarus *et al.* (2021) the key predictors of COVID-19 vaccine acceptance were perceived vaccine safety and perceived vaccine effectiveness.

Furthermore, the findings of a study conducted in Saudi Arabia emphasised that the significant factors influencing vaccination decisions and vaccine acceptance were COVID-19 vaccine safety and the effectiveness of the vaccine (Al-Mohaithef and Padhi 2020). Besides vaccine safety and vaccine effectiveness, socio-demographic and cultural factors impact vaccination decisions (Dror *et al.* 2020; Wong *et al.* 2020). According to Wong *et al.* (2020) the people with higher education and older people are inclined to accept the COVID-19 vaccines. The most people concerned with COVID-19 vaccine safety and vaccine efficacy are people from the

minority ethnic groups (Wong *et al.* 2020). This is affirmed by the findings of a study conducted in Ireland and the United Kingdom, which revealed that people with lower socioeconomic status are more hesitant to vaccinate against COVID-19 (Murphy *et al.* 2021). This necessitates the need for customised interventions that focus on inequalities to encourage vaccine acceptance and minimise vaccine hesitancy. Communication strategies focusing on public health play a significant role in influencing and changing public attitudes and perceptions regarding COVID-19 vaccines. According to Callaghan *et al.* (2020); and SteelFisher, Blendon and Caporello (2021) clear communication and transparency from public health experts is crucial and needed in a process of building trust with the general public to address factors that impacts vaccination decisions and minimise COVID-19 vaccine hesitancy.

### 3.6.3. COVID-19 Vaccine Hesitancy

A qualitative inquiry exploring communication and trust related to vaccine hesitancy cited that complacency, confidence and constraints continues to impact COVID-19 vaccine decision-making (Ledford *et al.* 2022). The concerns about the rushed vaccine development process and vaccine safety are some of the factors that influence vaccine hesitancy (Soares *et al.* 2021; Thorpe *et al.* 2022). Furthermore, studies conducted during the global vaccine rollout revealed that vaccine distribution to Africa is a cause for concern and contributes to vaccine hesitancy (Aborode *et al.* 2021; Ackah *et al.* 2022). There are issues of 'vaccine diplomacy' and nationalisation of vaccine in African countries that perpetuates vaccine hesitancy (Mutombo *et al.* 2022). In 2020, vaccines were advocated for on the African continent which challenged the attempts of combating the active cases of the COVID-19 pandemic (Makoni 2020). According to Mutombo *et al.* (2022) there were allegations that African countries were only suitable for vaccination trials because there were numerous COVID-19 vaccines distributed to Africa that were not regulatory approved.

Vaccine hesitancy in Africa was reinforced by these allegations that affirmed the opinions by two French medical Doctors in April 2020 (Aljazeera 2020; Mutombo *et al.* 2022). Australia and some countries in Europe were identified for COVID-19 trials, however, the two French medical Doctors commented on French TV that Africa is appropriate for vaccine trials and proposed to use the same approach for previously conducted AIDS studies (Aljazeera 2020). One of the French medical doctors retracted and apologised after these comments triggered and stirred public debates on social media (NBC 2020). This further fuelled mistrust and exacerbated vaccine hesitancy among South African citizens. According to Gavi (2023) the drivers for hesitancy are conflicting messages from government and the health experts, the disorganised way in which the media reported about COVID-19, fake news on social media and the language barriers. These drivers of hesitancy were identified in 2020 to assess the

COVID-19 vaccine rollouts aspects of acceptability with South Africans living in Soweto (Steenberg *et al.* 2022).

The South African experts' reviews published by Cooper, van Rooyen and Wiysonge (2021) highlighted that vaccine hesitancy is not new or unique. There are increasing numbers of communities and individuals who either reject or delay vaccination (Larson *et al.* 2014), seek or prefer alternative vaccination mechanisms (Dubé, Vivion and MacDonald 2015) and those who question vaccines (Hickler, Guirguis and Obregon 2015). The WHO see vaccine hesitancy as a health threat globally (Wiysonge *et al.* 2022). Vaccination hesitancy delay the proper implementation of the COVID-19 vaccine rollout programmes (George *et al.* 2022). Furthermore, HEIs acknowledge misinformation as an influence on vaccine hesitancy because anyone can post fake information on social media platforms (Saied *et al.* 2021). According to Ceron, de-Lima-Santos and Quiles (2021) when misinformation is shared by an influential person it can be believable to the public at large without verifying it. The misinformation about the pandemic influence COVID-19 vaccine hesitancy (Saied *et al.* 2021; Kricorian, Civen and Equils 2022). This resonate with HEIs, yet there is a gap in the literature on how universities are addressing the misinformation issue. Moreover, the implications of COVID-19 vaccination policy implemented by government and HEIs impacts vaccination decisions and increases vaccine hesitancy.

In an effort to combat the spread of the COVID-19 disease and to minimise COVID-19 hesitancy, HEIs and government implemented policies to lessen the impact of COVID-19 among the public and students. The COVID-19 mandatory vaccination policy has been vastly debated (Franco 2021; Gostin, Salmon and Larson 2021; Mulligan and Harris 2021; Opel, Diekema and Ross 2021; Cheng 2022). The influence of COVID-19 mandatory vaccination policy on staff and students' choice to vaccinate against COVID-19 is multifaceted. Even though mandatory vaccination policies increase vaccination uptake among staff and students, it can be argued that the mandatory vaccination policy infringes people's rights (Bardosh *et al.* 2022; King, Ferraz and Jones 2022) hence people will have no choice but to vaccinate so that they cannot be affected by the consequences outlined on the mandatory vaccination policy.

According to Bardosh *et al.* (2022) mandatory vaccination policies can do more harm than good because they limit access to work places, social life and the use of public transport dependent on COVID-19 vaccination status. Therefore, this promotes COVID-19 stigma and badly impacts the well-being of society (Bardosh *et al.* 2022). COVID-19 mandatory vaccination policies raises a number of concerns such as legal, ethical, practicality and access (Gur-Arie, Jamrozik and Kingori 2021a; Bardosh *et al.* 2022; Williams 2022). Vaccine access is one of the influencing barriers that limits staff and students' vaccination decisions. Vaccine

access issues are the lack of resources, such as transportation to vaccination stations and limited operational times at the vaccination stations (Rosen *et al.* 2021). This can lead to more vaccine hesitancy and non-compliance to COVID-19 protocols which stemmed from the implemented COVID-19 mandatory vaccination policy.

### **3.7. RESEARCH GAP**

Since the outbreak of COVID-19 scholars have identified various fields where the impact of COVID-19 can be investigated. A study by George *et al.* (2022:1) investigated the “university staff and students’ perspectives, preferences, and drivers of hesitancy regarding COVID-19 vaccines” at the University of KwaZulu-Natal. Even though their study was targeted at a population who share some characteristics (staff and students) with the population of this study, the institutions under study are not the same hence the research gap. The proposal of this study was submitted in August 2021 for Departmental Review. At that time, there were no research studies investigating the impact of COVID-19 vaccine communication on staff and students’ choice to vaccinate against COVID-19 in a context of a University of Technology in South Africa.

### **3.8. CONCEPTUAL FRAMEWORK**

The conceptual framework illustrates what a researcher expects to find through research. It indicates the variables of the study and maps out how they are connected (the relationship) to each other (Grant and Osanloo 2014; Ngulube, Mathipa and Gumbo 2015). The diagrams included in a conceptual framework allows the research to clearly define variables and display their relationships. Once the relationship is known, the researcher will have a direction on how the identified research problem will be explored. The conceptual framework is developed based on the literature review of the study (Varpio *et al.* 2020). In a conceptual framework there are two key variables; namely, independent variable and dependent variable (Flannelly, Flannelly and Jankowski 2014). According to Flannelly *et al.* (2014) dependent variables depend on the independent variable hence the researcher probes more on the dependent variables. This study has three independent variables and one dependent variable.

#### **3.8.1. Independent and dependent variables**

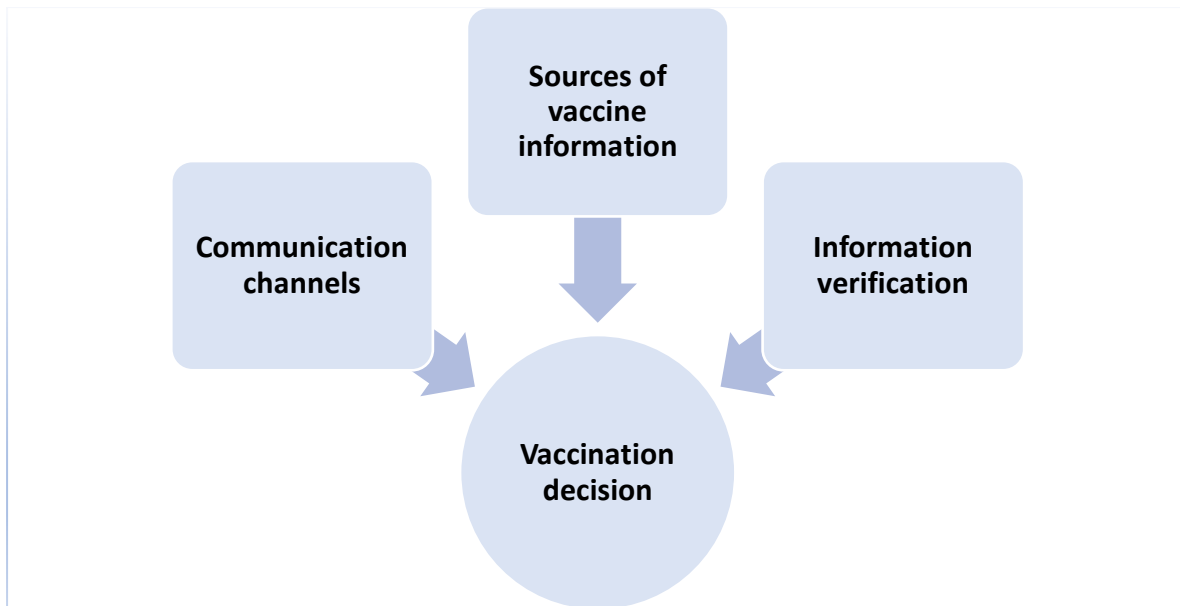
The independent variables are communication channels, sources of vaccine information and information verification. The dependent variable is vaccine decisions. Vaccine decisions is a dependent variable because for staff and students to decide to vaccinate against COVID-19 they will have access to the university communication channels. The characteristics of the communication channels are *type* of communication channels, *access* to the communication channels and the *content* of information disseminated through the communication channels. The type of communication channels used to access the COVID-19 vaccine communication

impacts vaccination decisions. In the context of this study, the type of communication channels are the university's formal communication channels and external sources such as journal articles, media channels, etc. Access is related to staff and student's internet connection to access the communication channels. The lack of access to communication, the less informed staff and students which impacts vaccination decisions. Contents relate to the type of COVID-19 vaccine communication disseminated through the communication channels. The aim of vaccine communication is to inform and offer guidance especially when there is a need to adopt health behaviour. Therefore, the content of disseminated COVID-19 vaccine communication through communication channels for staff and students needs to include a variety of information that will positively influence the expected outcome which is vaccination decisions.

Staff and students are in a field of higher learning institution; therefore, it can be expected that they might need to source their own vaccine information by using different types of sources available to them. A systematic review cited that "message features, message channels and sources can make a difference in persuasiveness" (Xia and Nan 2024: 8). The characteristics of sources of information are *the access* to sources of information and the *type* of sourced information. In the context of this study, the access to sources of information impacts vaccine decisions. For example, consultation with health experts and searching for information on social media will not reveal the same results. Health experts are certified and legally approved to offer medical advice, however, on social media anyone who has access to it can post rumours, conspiracy theories and information not verified by health experts. This variety of information may cause confusion and delay staff and students' vaccine decision making process.

Furthermore, if staff and students are still uncertain or hesitant to make a vaccination decision, they will verify the information that they found from other sources with the COVID-19 vaccine communication disseminated by their university. Only then they can reach a vaccination decision. The characteristic of information verification is process. The process followed to verify information impacts vaccination decisions, the longer the process, the longer staff and students will take to make vaccination decisions.

See Figure 5 below outlined relationship between the independent and dependent variables.



**Figure 5: Independent and dependent variables for the study. Source: Authors own illustration (2024)**

There are other modifying factors that may influence the relationship between these three independent variables and the dependent variable discussed above. In the conceptual framework these modifying factors are mediator variables, moderator variables and control variables. The moderator variables do not affect the independent variables, even though the independent variable affects the dependent variables (Namazi and Namazi 2016). However, this study only focuses on independent and dependent variable.

### **3.9. CONCLUSION**

This chapter outlined the literature on vaccine communication in an education sector. It presented global and local perspectives of the COVID-19 pandemic, COVID-19 awareness, COVID-19 vaccine awareness, COVID-19 response strategies, COVID-19 vaccine rollout and COVID-19 vaccine hesitancy. To probe further on the issues of vaccination, the impact of vaccination was explored with reference to past studies and their recommendations. The chapter also presented the conceptual framework of this study. Moreover, this chapter discussed the literature that relates to COVID-19 in the education sector and highlighted important concepts of this study. The concepts serve as a guide to analyse and interpret themes and sub-themes for the collected data. The conceptual framework presented the relevant dependent variables, independent variables of this study and map out how they are related to each other. Furthermore, the moderating variables were identified per independent variables. The next chapter explores the research methodology of this study.

## CHAPTER 4

### RESEARCH METHODOLOGY

#### 4.1. INTRODUCTION

This chapter presents the research methodology process followed to conduct the study and outlines how the research was conducted. The research methodology in a study aims to outline the work plan of research by discussing how the research will be conducted (Rajasekar, Philominathan and Chinnathambi 2013). It defines the research approach and its importance for this study. The research design, nature of research and data sources are thoroughly discussed. This study used a procedure to ensure validity by pre-testing interviews and survey as research instruments. Moreover, this chapter discusses the process of obtaining permission from the institution (the case university), obtaining informed consent from the participants (staff and students), ensuring confidentiality and anonymity and obtaining ethical clearance from the institutional research ethics committee to establish the authenticity of this study.

#### 4.2. RESEARCH PARADIGM

Research paradigm “constitutes the abstract beliefs and principles that shape how a researcher sees the world, and how s/he interprets and acts within that world” (Kivunja and Kuyini 2017: 26). The first step of research is adopting a research paradigm as it is a foundation for methodology in a study (Okesina 2020). It ensures that the collected data clearly answers the research questions that are linked to the research objectives. There are a variety of research paradigms; namely, positivism, constructivism or interpretivism, critical realism, pragmatism, subjectivism etc (Avenier and Thomas 2015). This study adopted pragmatism research paradigm. Pragmatism research paradigm focuses on research questions, the significance of research and it is usually associated with mixed methods (Creswell and Clark 2017; Kaushik and Walsh 2019). The best method used to collect data from participants is the one that solves the research problem and achieves the research objectives (Dominion Dominic 2023). As a research paradigm, the pragmatism focuses on the facts from the gathered data and claims that the research problem determines the research perspective. This study adopted the pragmatic approach to complement the limitations of either qualitative or quantitative methods by using mixed methods for data collection.

Adopting the pragmatic research philosophy allows researchers to analyse a phenomenon from both an objective and subjective point of view (Saunders, Lewis and Thornhill 2009). Furthermore, there is an automatic link between the pragmatic research approach and mixed methods research, which involves the use of both quantitative and qualitative data (Bryman *et al.* 2014; Morgan 2014). This research paradigm assisted the researcher by identifying the problem and exploring the problem broadly by seeking a better understanding of the problem

with the intention of solving it. The researcher established the purpose of the research by identifying the focus and the main aim of the study. This study seeks to investigate the impact of COVID-19 vaccine communication on staff and students' choice to vaccinate against COVID-19 at a South African University of Technology.

To determine the significance of the study, the researcher discovered the problem. The discovered problem of this study is the vaccination hesitancy among staff and students. Their vaccination hesitancy stems from misinformation, myths and rumours posted on informal communication channels as well as the non-existent engaging on university platforms to raises issues and concerns about vaccination. Whilst conducting the study, the researcher gained a better understanding of staff and students' health behaviour and beliefs regarding their vaccination decisions.

To establish the foundation for the study, Chapter 2 and Chapter 3 of this study presented and discussed the literature review, theoretical and conceptual framework from academic journal articles and books, online newspapers, internet search, health organisations websites, government websites, HEIs websites, podcasts, radio and television to be updated about COVID-19 disease and issues of the COVID-19 vaccines. Moreover, the researcher compiled a research methodology with the aim to address the research problem and to achieve the objectives of the study. Research methodology includes the types of research instruments used to collect data, data collection procedure, data analysis process and ethical considerations. This study used both qualitative and quantitative methods to gain in-depth understanding of the problem and to establish the distinctiveness of the study by interviewing staff and administering follow-up surveys to staff. To expand on the findings, the researcher distributed the survey to students.

### **4.3. RESEARCH DESIGN**

According to Akhtar (2016:68) research design is a structure "that holds all the elements of the research project together". Research design is a detailed plan with activities which indicates how the research will be conducted. Research design ensures that the collected data assists the researcher to answer the research questions clearly (Hunziker and Blankenagel 2021). The purpose of research is to outline the overview of the research process and provide direction to conduct research. The research design serves as a strong foundation for significant research studies. The significance of the research studies can be established by the correlation of the research focus and main aim, research problem, research objectives and questions and the process used to analyse the collected data to present the findings that addresses the discovered research problem. The different types of research designs are descriptive, explanatory, exploratory, case study, cohort, action research and prediction –

correlation – and causation or casual (Asenahabi 2019). The exploratory research design is usually used in social sciences to address existing issues with new or different perspectives (Mason, Augustyn and Seakhoa-King 2010:444). The exploratory research design allows the researcher to firstly collect the qualitative data to be analysed and follow up with quantitative data collection (Clark *et al.* 2003; Krosnick 2018). The qualitative method and quantitative method are both equally important in data collection as this is an exploratory study.

#### 4.3.1. Nature of the Study

This study was conducted with the aim of gaining valuable insights into the identified research problem as there were no current research studies to refer to conducted at a South African University of Technology focusing on employed communication channels to create COVID-19 awareness and encourage vaccination, COVID-19 vaccination decision-making, sourcing and verifying COVID-19 vaccine and vaccination information. To integrate qualitative and quantitative data, the nature of this study is exploratory sequential mixed methods (Creswell *et al.* 2003; Guetterman, Fetters and Creswell 2015). The exploratory mixed methods for this study started with collecting data from in-depth interviews for qualitative data, followed by administering a survey for quantitative data collection. Both qualitative and quantitative data were collected until saturation followed by analysis and data interpretation.

#### 4.3.2. Data Source

The researcher can collect data using two methods: primary data sources and secondary data sources. Primary data sources refers to data collected by the researcher for the first time and secondary data sources is data collected and published by others (Ajayi 2017). Furthermore, secondary data source can be referred to as desk review where data can be collected from organisations websites or where the information was published and available to the public and the stakeholders of the organization (Pandey and Pandey 2021). To address the identified research problem and to achieve the research objectives, this study used both primary and secondary sources. The primary data for this study was collected from staff and students through interviews and surveys. This study used internal desk research approach to collect secondary data (Kalu, Unachukwu and Ibiam 2019). The secondary data were collected through scholarly journal articles, organisations websites, organisations policy documents, newspapers and DUTs online platforms; namely, website and social media pages or accounts.

### 4.4. TARGET POPULATION

In research, the population is defined as the entire group of where the sample will be selected (Pandey and Pandey 2021). The population comprises of objects which may be events, organisations, individuals, groups, human products and or the conditions to which they are exposed (Welman, Kruger and Mitchell 2005). The target population of this study was a South

African University of Technology located in two cities (Pietermaritzburg and Durban) from the KZN province. The researcher targeted population groups who were staff and students in this South African HEI. The targeted population of this study were all lecturers and postgraduate students in the Faculty of Management Sciences and Faculty of Accounting and Informatics from the Department of Applied Management, Finance and Information Management and Public Management Law & Economics at the Durban University of Technology, located in Pietermaritzburg at the Riverside Campus. Data from ITSS in Table 1 below shows that in the year 2023, there were about 75 lecturers and 250 postgraduate students in these three departments.

Population group (In all 3 departments)	Population size
Lecturers	75
Students	250

**Table 1 - Population size of the targeted population group as per year 2023 ITSS data. Source: Authors own illustration (2024)**

#### **4.5. SAMPLING**

A sample is a group of the targeted population selected for the study. There are two types of sampling methods: namely, probability and non-probability sampling. Probability sampling is a method that stipulates that the sample represents the population and the non-probability sampling is as method that does not have an indication of the sample that represents the population (Pandey and Pandey 2021). Probability sampling methods are simple random sampling, systematic sampling, stratified sampling and cluster sampling (Pandey and Pandey 2021; Mize and Manago 2022). Non-probability sampling methods use different techniques of sampling; namely, incidental or accidental sampling, judgment sampling and purposive sampling (Pandey and Pandey 2021).

##### **4.5.1. Sampling Method**

Sampling method refers to the selection of a small group to represent the whole population where research will be conducted. For the purposes of this study, purposive sampling and stratified random sampling were used as the sampling technique. The purposive sampling involves the “deliberate choosing of participants by the researcher due to the qualities the participant possesses” (Etikan, Musa and Alkassim 2016:2). Purposive sampling is selected in research studies as it is known to represent the whole population and to ensure the adequate representation of each group from the targeted population (Pandey and Pandey 2021; Mize and Manago 2022). Non-probability purposive sampling was employed for both qualitative and quantitative parts of this study. This technique was chosen to ensure the focus is only on the identified sample of the population with characteristics that will assist the researcher to meet the objectives of the study. Furthermore, the stratified random sampling was used for the quantitative part of this study. The stratified random sampling classify data

“into multiple subgroups base on common characteristics such as age, gender, race, income, education, and ethnic origin” (Rahman *et al.* 2022: 48). In stratified random sampling, the multiple subgroups are known as strata and then the sample size is drawn from each stratum with a sample size proportional to the stratum size in the population (Glasgow 2005; Rahman *et al.* 2022). For this study, the stratified random sampling allowed the researcher to have more leeway across the subgroups or strata which are staff and students to make sure that they are included. For this study, each department represents stratum.

#### 4.5.2. Sample Size

Sample size is dependent on the nature of the research study (Lohr 2021). For mixed methods, the researcher needs to consider some of the qualitative issues and quantitative measures like the nature of the research, nature of analysis and the variability of the population characteristics. Various studies indicate that the adequacy of the sample size is determined by data saturation (Benzer *et al.* 2013; Gonzalo *et al.* 2013; Marshall *et al.* 2013; Kruth 2015). Data saturation is reached when there are no new themes emerging from the collected data (Fusch and Ness 2015; Aldiabat and Le Navenec 2018). According to Braun and Clarke (2021), when data were collected until saturation is reached, it also improves the validity of the study. There are no standardized guidelines to estimate sampling size that will reach data saturation (Galvin 2015). For the qualitative stage, this study targeted to interview 30 (see Table 2 below) participants guided by the recommended 20 to 30 qualitative sample size guidelines of Creswell and Poth (2016).

Population size	Sample size based on (Creswell and Poth 2016)	Data saturation
75	20 to 30	15

**Table 2 - Sample size for interviews guided by (Creswell and Poth 2016). Source: Authors own illustration (2024)**

As per above Table 2 above, data saturation was reached with 15 participants. The Table 3 below indicates that the interviewed participants were staff members who were lecturers from the three stratum: namely, the Department of Applied Management, Finance and Information Management and Public Management Law & Economics.

Department representation	Conducted interviews
Department of Applied Management	11
Finance and Information Management	3
Public Management Law & Economics	1

**Table 3 - Response rate of interviewed participants per department. Source: Authors own illustration (2024)**

The quantitative data were collected from both lecturers as well as postgraduate students who were registered in the year 2023 from the two postgraduate programmes: Advanced Diploma

and Postgraduate Diploma in these three departments. Gill, Johnson and Clark (2010) provide a table which presents an adequate sample size for a given population based on precision, confidence levels and a population percentage or variability of 50% (a figure that is suggested to be widely accepted by researchers to maximize variance). With a confidence interval of 95%, the table shows that for a population of 75 participants a sample size of 63 is adequate and 151 is adequate for a population of 250. As indicated in 4.5.1, the stratified random sampling allowed the researcher to have more leeway across the subgroups to make sure that they are included. Therefore, Table 4 below indicates that the questionnaires were allocated to 21 lecturers and 50-51 postgraduate students from each of the three departments to be filled in through an online survey. This was to ensure equal representation from all the three departments selected to collect data for this study.

Population group (In all 3 departments)	Population size	Sample size (based on (Gill, Johnson and Clark 2010).	Returned Questionnaires	Response Rate
Lecturers	75	63	49	78%
Students	250	151	97	64%

**Table 4 – Questionnaires were distributed per sample size based on Gill, Johnson and Clark (2010). This table indicate returned questionnaires and response rate. Source: Authors own illustration (2024)**

According to Wu, Zhao and Fils-Aime (2022), the average online survey response rate is 44.1%. This response rate is influenced by sending an online survey to a clearly defined population rather than distributing the online surveys to more participants which does not generate high response rates (Wu, Zhao and Fils-Aime 2022). Table 4 above indicates the response rate for lecturers at 78% and 64% for students. These response rates indicate that they are above average, especially for questionnaires completed through online survey.

#### **4.6. MEASURING INSTRUMENTS (interviews and questionnaires)**

The research instrument for qualitative data had open ended questions that allowed the participants to elaborate on their provided answers. During qualitative data collection, the interviews with the participants allowed the researcher to witness the attitude and behaviour of the participants related to the questions asked. Data were collected through face-to-face in-depth interviews with staff. The research instrument for the quantitative data was a questionnaire. To expand on the findings gathered from the interviews, the researcher emailed a link to an online survey where staff and students were asked to complete the questionnaire.

##### **4.6.1. Interview Procedure**

The researcher secured interviews with participants by sending emails of interview requests. The list of participants was requested and obtained from the secretaries of the three departments. The email request for interviews included attachments of the following

documents: letter of information, consent letter, permission letter and ethical clearance letter. The participants fixed their appointment schedule and were interviewed in their offices at the premises of the case university.

#### 4.6.2. Survey Procedure

The link of the online survey was sent to the participants who were interviewed and to students. The email list of students was requested and obtained from the secretaries of the three departments. The email request for online survey included attachments of the following documents: letter of information, consent letter, permission letter and ethical clearance letter. The participants were able to access the online survey and completed the questionnaires at their own time.

### 4.7. DATA ANALYSIS

Upon completion of data collection, the researcher had to analyse the data. Data analysis “is the classification and interpretation of material to make statements and meaning of what the material is represented in it” (Mezmir 2020: 15). Data for this study was analysed thematically and quantitatively.

#### 4.7.1. Thematic analysis

Thematic analysis using NVIVO software was used for the qualitative analysis. Thematic analysis is a “technique that is used to analyse data by systematically processing codes to create descriptive themes” (Vaismoradi *et al.* 2016: 100). This technique allows flexibility when interpreting the data by grouping it in main themes. The qualitative interview schedule (Attachment 6: research instrument – interviews) is attached.

#### 4.7.2. Quantitative Analysis

Descriptive statistics can be referred to as describing a dataset statistically while inferential statistics can be defined as “using the sample descriptive statistics to make an estimation of the population” (Sutanapong and Louangrath 2015: 22). The descriptive statistics will include the mean, mode, median and standard deviation. These statistics will serve to confirm the results of the graphical statistics and frequency tables. The participants’ response scores will be analysed this way. The data were tested whether it comes from a normal distribution or not and this is done using the Kolmogorov Smirnov test (Berger and Zhou 2014). Therefore, proceeded to the type of statistical tests permitted to use. This study used the parametric tests such as the independent sample t-tests, “a type of t-test is a type of statistical test that is used to compare the means of two groups” (Kim 2015: 540). This statistical test was used to check for differences between the mean scores of the males and females with respect to the impact of COVID 19 vaccine communication on staff and student’s choice of vaccination at a South African University since the population of this study has only two categories. Descriptive

statistics will present the summarised data using graphs or and tables and the inferential statistics will answer research question by accessing whether the data gathered applies to the targeted population. Descriptive and inferential statistics using SPSS software was used for the quantitative aspect of the study. The quantitative questionnaires (Attachment 7: research instrument – survey) is attached. Bar graphs and frequency tables will be processed using SPSS (version 28) to gain an overview of the perceptions of participants with respect to the impact of COVID 19 vaccine communication on staff and student’s choice of vaccination at a South African University.

#### **4.8. PRE-TESTING**

Before collecting data, the researcher conducted a pilot study to pre-test the research instrument for interviews and surveys. Research studies advocates for 12 people to be part of a pilot study (Julious 2005; Viechtbauer *et al.* 2015). However, the pilot study was a guided discussion facilitated by the researcher with eight (8) people who were close as possible to the participants of the study. Eight people were a complete representative of the population for the department identified for pre-testing. The pilot study assisted the researcher to identify possible challenges that the researcher may come across when collecting data and verifying the consistent understanding of questions from the research instrument and the context, especially for the interviews (Lowe 2019). At the end of the pilot study, the researcher rephrased and restructured questions in the research instrument using the vocabulary that is understood by the participants.

#### **4.9. SCOPE OF THE STUDY**

The study was limited to a South African university; namely, the DUT that is located in KZN province where the researcher works and study to minimise the limitations for data collection. The researcher selected DUT because of its large stakeholders, especially staff and students that come from different backgrounds. Furthermore, this study is limited to three departments in a University of Technology located in KZN in South Africa.

#### **4.10. RELIABILITY AND VALIDITY**

Reliability can be defined as consistency throughout the process of data collection (Pandey and Pandey 2021). Through data collection the participant is expected to respond with the same answer when a question is repeatedly asked to ensure reliability and consistency. However, reliability consistency is lost when the participant changes their response to the repeatedly asked question. Validity of the research instrument is determined by measuring what it is expected to measure (Pandey and Pandey 2021). To ensure the reliability and validity of this study, the researcher collected data only from the targeted participants who, because of their level of study, can engage honestly and constructively with the researcher. The consistent and accurate research instrument is important in ensuring research validity and

reliability (Taherdoost 2016: 28). As mentioned in the nature of the study in Section 4.5.2 above, data were collected until data saturation was reached. Data saturation is a method mostly used by researchers in a qualitative study to assess the qualitative sample size to ensure the validity of the study (Guest, Namey and Chen 2020). The research design assists the researcher to generalize the findings collected from the participants. Upon defining the research population, selecting the research sample and appropriate analysis tool, the researcher can generalize the findings (Pandey and Pandey 2021).

To ensure that the findings of this study are generalisable, the sequential mixed-method approach was adopted. Using mixed methods to collect data allows the researcher to have a clear understanding of the study whilst the validity and reliability of the findings are improved (Green *et al.* 2015; Heale and Twycross 2015; Noble and Smith 2015). To obtain valuable findings, the interviews and survey only assessed what it intended to assess to ensure that the discussion of the findings are valid. The interviews and surveys are strong research instruments intended to conduct research with consistency. To improve and ensure the validity and reliability of the findings, triangulation was used as a test and to generalise the findings.

#### 4.10.1. Triangulation

Mixing methods in research enables triangulation (Steenkamp and Tekelas 2021). In research, triangulation refers to the utilisation of more than one method to researching a question related to the research problem (Heale and Forbes 2013). Triangulation types are data triangulation, investigator triangulation, theory triangulation and methodological triangulation (Thurmond 2001; Abdalla *et al.* 2018). This study uses data triangulation which involves using multiple sources of data collection in a research study (Dzwigol 2020). Therefore, in this study the qualitative research is the verbal data where participants respond and elaborate their answers to certain questions and the quantitative research is the non-verbal data where participants only selected their best possible answers in a survey. The researcher firstly conducted interviews followed by surveys. Data triangulation assisted the researcher by enhancing the reliability and validity of the findings. The reliability of this study is thoroughly discussed in Section 5.4 in this chapter.

### 4.11. ETHICAL CONSIDERATIONS

Completing a basic e-training ethics is one of the Faculty requirements that need to be met by a researcher before conducting a study. Before the study is conducted, the primary researcher enrolled for basic e-training on ethics of health research related to human beings offered by Training and Resources in Research Ethics Evaluation (TRREE). The assessments of the e-training were conducted online, thereafter, the researcher was awarded a certificate. While conducting the study, only the primary researcher had access to the information related to the

study, especially participants responses gathered through survey and interviews. After conducting the study, the data collected was stored electronically with a password to protect it. To ensure ethical standards were met the password was only known by the primary researcher. The signed consent letters were stored in a secure place in the Department of Applied Management. After five years the documents will be shredded and electronic copies deleted even on the recycle bin.

#### 4.11.1. Research approval

Upon receiving provisional ethics clearance from the Institutional Research and Ethics Committee (IREC), the researcher approached the institution (Durban University of Technology) where the study was conducted via the gatekeeper's office to request a gatekeeper's permission to conduct the study. An approved research proposal by the Faculty Research Committee with the information letter (Attachment 3), consent letter (Attachment 4), IREC provisional approval and TRREE certificate (Attachment 5) was attached to the letter that was emailed to the gatekeeper requesting permission. The gatekeeper's office granted permission (Attachment 2) to conduct the study and IREC granted the researcher full approval with reference **IREC174/2022** (Attachment 1) to conduct the study.

#### 4.11.2. Informed Consent

The participation in this study was voluntary, participants were not forced or tricked to participate. Both staff and students were asked for full consent to participate in the study and were provided with the letter of information and consent letter prior to the study. During the data collection, the participants were not subjected to harm, humiliation and disrespect.

#### 4.11.3. Confidentiality and anonymity

The protection of privacy and confidentiality was prioritised by the researcher by using aliases when conducting interviews, analysing and interpreting data and in excerpts included in Chapter 6. The data collected has been stored electronically with a password to protect the information. The password is only known by the primary researcher.

### **4.12. CONCLUSION**

This chapter discussed the research methodology of this study by exploring the research paradigm, research design, target population, sampling procedure, measuring instruments, the data analysis process, pre-testing, limitations of the study, reliability and validity, ethical considerations and limitations of the study. This study adopted pragmatism research paradigm because it focuses on the facts from the gathered data and claims that the research problem determines the research perspective. This is an exploratory study as it uses both qualitative and quantitative methods. The exploratory methods of this study firstly conducted interviews with staff followed by a survey which was administered to both staff and students. Qualitative

and quantitative data were collected until data saturation. This study primarily sourced data through interviews and surveys.

Furthermore, this study sourced secondary data through internal desk research approach. The targeted population of this study were staff and students from departments in one of the institutions satellite campuses in Pietermaritzburg. Non-probability purposive sampling was employed for qualitative and quantitative parts of this study. This allowed the researcher to purely focus on the identified sample of the selected population. Data were analysed through descriptive statistics for the qualitative aspects of the study. Descriptive and inferential statistics using SPSS software was used for the quantitative aspect of the study. Before data collection, a pilot study was conducted with the participants who were close as possible to the targeted participants of the study.

This study was limited to a University of Technology in KZN because of the diversity of its population. This study adopted data triangulation approach to ensure validity and credibility of the findings. The researcher only collected data after the approval and ethical clearance was granted by the case university. The participants were provided with a letter of information and consent letter before data collection. Furthermore, to ensure confidentiality and anonymity the researcher used aliases during interviews and electronically stored the collected data with a protective password. The next chapter presents the results from the data analysis and outlines biographical details of the participants and reports on the hypothesis testing.

## CHAPTER 5

### PRESENTATION OF FINDINGS

#### 5.1. INTRODUCTION

The previous chapter discussed the research process followed to conduct this study. This chapter presents the biographical information of the participants from the interviews and surveys. The biographical information will be presented in the form of figures, graphs and tables. For data collection, this study adopted mixed methods. The qualitative data were collected in the form of in-depth interviews and the quantitative data were collected through a survey. The interviews biographical information included gender, race, age, residential location, home language and department. The survey biographical information has offered valuable insights into the demographic characteristics of the participants, shedding light on their designation, gender, race, residential location and home language. The participants' statistics show the diverse nature of the surveyed group and provides important information that can have implications for various contexts. Moreover, the report on how reliability was ensured, results of hypothesis testing, results of findings per research objectives, participants vaccination status and triangulation will be discussed.

#### 5.2. DEMOGRAPHIC INFORMATION: Qualitative interviews

For the qualitative aspect of the study, participants were interviewed face to face. These interviews were conducted with only academic staff who are lecturers. 15 participants were interviewed, which consisted of eight males and seven females. The males were (53.3%) more than females (46.7%) in the qualitative data for this study. The total number of the interviewed sample was dominated by the black race group (80%) followed by the White race group (20%). The 80% was made of 12 participants and 20% equal to three participants. The average age of the interviewed participants in the study was 41.27 years old. Most of the participants resided in Pietermaritzburg 11 (73.3%) where this study was conducted and only (26.7%) four participants resided in Durban. The modal home language was 'Other' languages at (50%) followed by isiZulu (28.6%) and English (21.4%). There were 11 (73.3%) interviewed participants from the Department of Applied Management, three (20%) interviewed participants from the Department of Public Management, Law and Economics and only one (6.7%) participant was interviewed from the Department of Finance and Information Management.

#### 5.3. DEMOGRAPHIC INFORMATION: Quantitative questionnaires

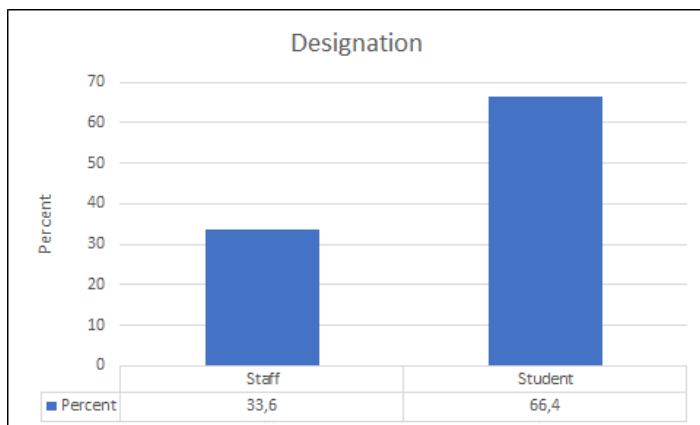
The participants that responded to the call to complete questionnaires through online survey were academic staff and students as per indicated target population in Chapter 4, Section

(4.4). The survey link was emailed to the interviewed staff briefly after the interview and the survey link was emailed to the students after data saturation was reached during the interviews.

### 5.3.1. Designation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Staff	49	33.6	33.6	33.6
	Student	97	66.4	66.4	100.0
	Total	146	100.0	100.0	

**Table 5 – Designation of participants as per questionnaire responses. Source: Authors own illustration (2024)**



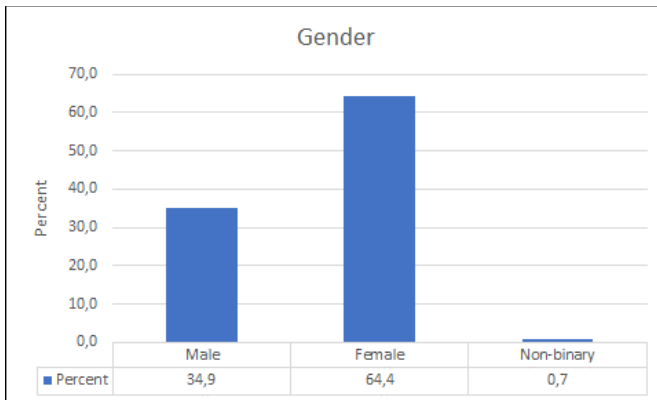
**Figure 6 - Designation of participants as per questionnaire responses. Source: Authors own illustration (2024)**

The participants were categorised into two groups: "Staff" and "Student". Approximately one-third of the participants (33.6%) identified themselves as staff members, while the majority (66.4%) were students. The questionnaire captured a mix of staff members and students. This finding suggests that the study or institution involved in the online survey comprises both important stakeholders of the case university, indicating a balanced representation of these groups.

### 5.3.2. Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	51	34.9	34.9	34.9
	Female	94	64.4	64.4	99.3
	Non-binary	1	.7	.7	100.0
	Total	146	100.0	100.0	

**Table 6 – Participants gender statistics as per questionnaire responses. Source: Authors own illustration (2024)**



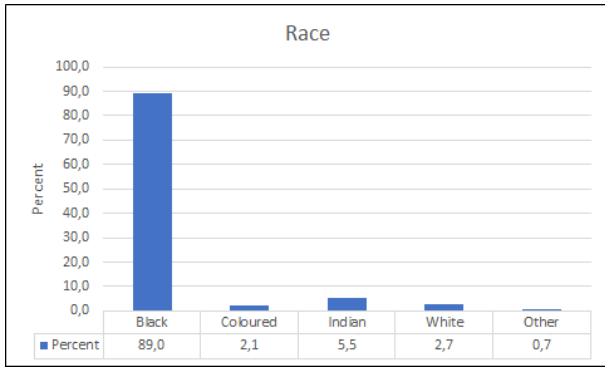
**Figure 7 - Participants gender statistics as per questionnaire responses. Source: Authors own illustration (2024)**

The gender distribution among the participants was diverse, with three categories: "Male", "Female" and "Non-binary". The questionnaire revealed that 64.4% of the participants identified as female, while 34.9% identified as male. A small proportion (0.7%) identified as non-binary. The gender distribution highlights the importance of gender inclusivity in the study or in the workplace. The presence of non-binary individuals indicates a willingness to recognise and accommodate diverse gender identities, which can contribute to a more inclusive and supportive environment.

### 5.3.3. Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Black	130	89.0	89.0	89.0
	Coloured	3	2.1	2.1	91.1
	Indian	8	5.5	5.5	96.6
	White	4	2.7	2.7	99.3
	Other	1	.7	.7	100.0
	Total	146	100.0	100.0	

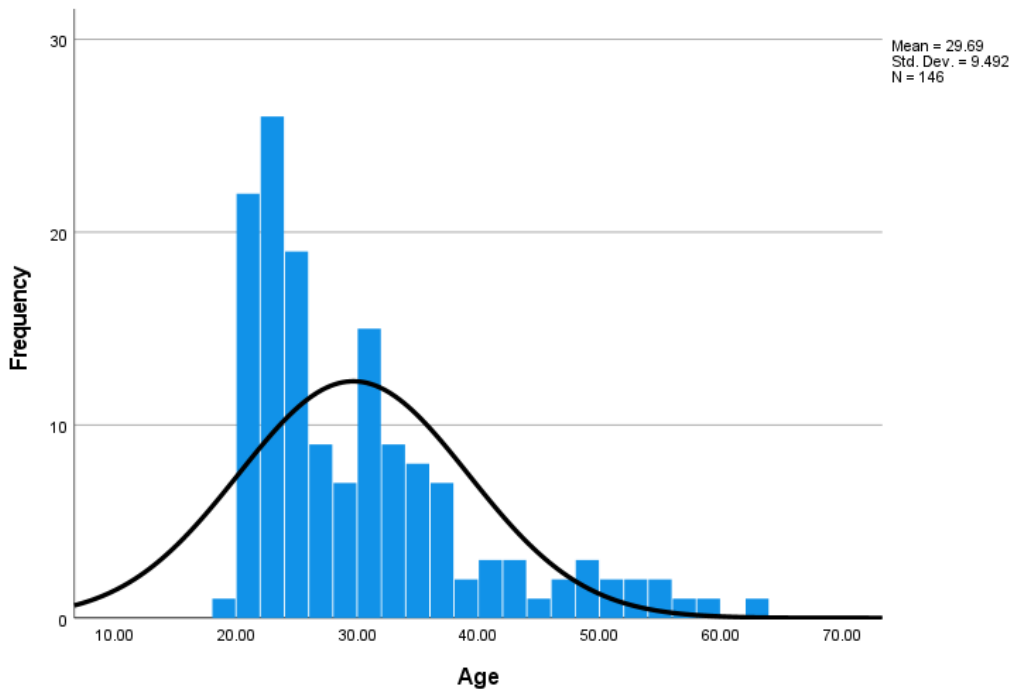
**Table 7 - Participants race statistics as per questionnaire responses. Source: Authors own illustration (2024)**



**Figure 8 - Race (survey)**

Most participants (89.0%) identified as Black. Other racial groups, such as "Coloured" (2.1%), "Indian" (5.5%) and "White" (2.7%) constituted a smaller proportion of the sample. The racial composition of the participants showcases the diversity of the surveyed group. The predominance of individuals identifying as "Black" suggests a potentially representative sample, reflecting the racial demographics of the region or the institution under study. Additionally, the presence of other racial categories further enriches the diversity of perspectives and experiences in the surveyed population.

### 5.3.3. Age



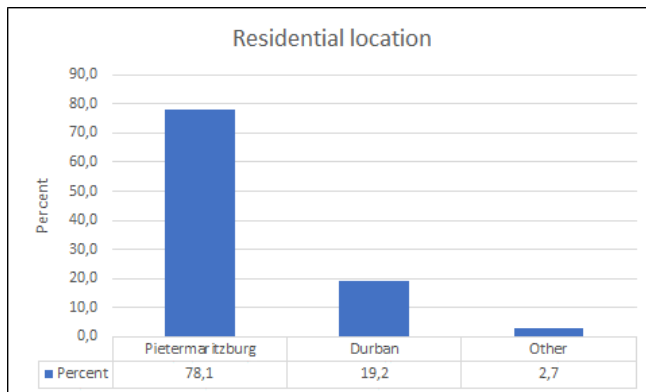
**Graph 1 - Age (survey)**

The average age of the participants was 29.69 years.

#### 5.3.4. Residential Location

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pietermaritzburg	114	78.1	78.1	78.1
	Durban	28	19.2	19.2	97.3
	Other	4	2.7	2.7	100.0
	Total	146	100.0	100.0	

**Table 8 – Participants’ residential location statistics as per questionnaire responses. Source: Authors own illustration (2024)**



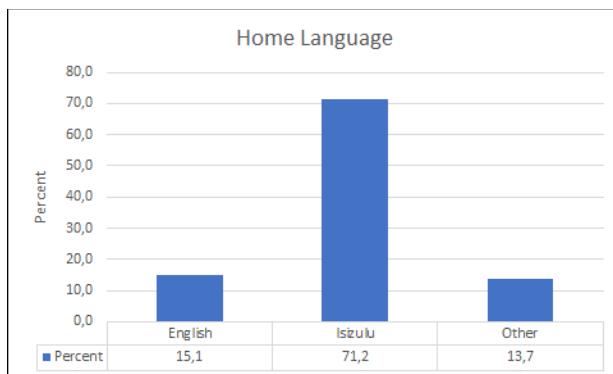
**Figure 9 – Participants’ residential location statistics as per questionnaire responses. Source: Authors own illustration (2024)**

The participants were asked to provide their residential location, and the data revealed that the majority of participants (78.1%) reported living in Pietermaritzburg. A significant proportion (19.2%) resided in Durban, while a small percentage (2.7%) lived in other locations. The information on residential location provides useful insights into the geographic distribution of the participants. The majority resided in Pietermaritzburg and a significant proportion in Durban may have implications for understanding the study's regional relevance or the location of the organisation involved.

#### 5.3.5. Home Language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	22	15.1	15.1	15.1
	Isizulu	104	71.2	71.2	86.3
	Other	20	13.7	13.7	100.0
	Total	146	100.0	100.0	

**Table 9 – Participants’ home language statistics as per questionnaire responses. Source: Authors own illustration (2024)**



**Figure 10 – Participants’ residential location statistics as per questionnaire responses. Source: Authors own illustration (2024)**

The questionnaire explored the home language of the participants, with options such as "English", "Isizulu" and "Other". The findings indicated that 71.2% of the participants reported Isizulu as their home language. English was the second most common home language, representing 15.1% of the sample, while other home languages accounted for 13.7%. The data on home language reveals the linguistic diversity in the surveyed group. The significant prevalence of Isizulu and English as home languages indicates the importance of considering multilingual communication strategies, especially in educational or professional settings.

### 5.3.6. Participants’ Vaccination Statistics

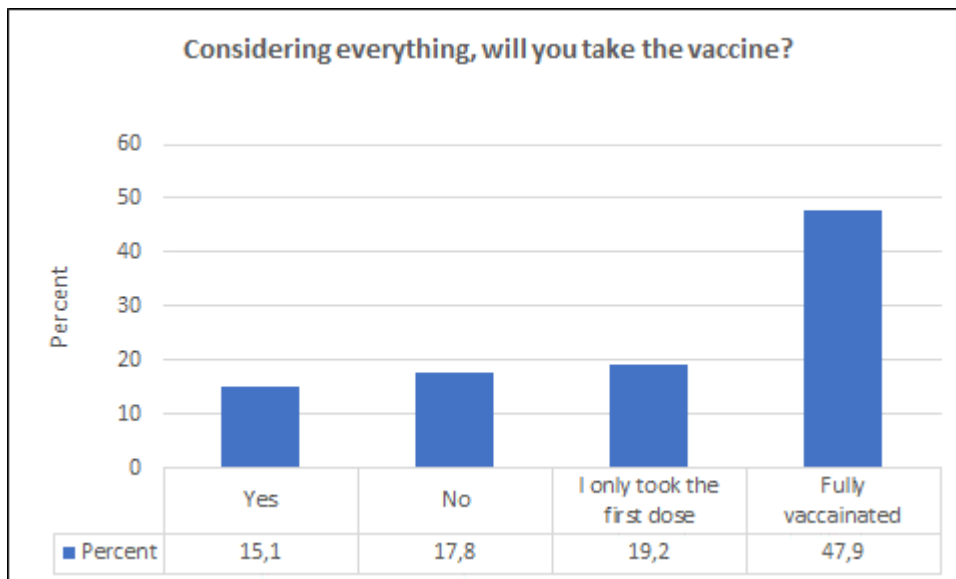
At the end of the questionnaire, the researcher asked: “*Considering everything, will you take the vaccine?*”. Disclaimer, the responses below in Table 10 and Figure 11 does not represent the whole population of the three departments where this study was conducted. However, they raise a concern about staff and students’ perceptions and beliefs about COVID-19 vaccination.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	15.1	15.1	15.1
	No	26	17.8	17.8	32.9
	I only took the first dose	28	19.2	19.2	52.1
	Fully vaccinated	70	47.9	47.9	100.0
	Total	146	100.0	100.0	

**Table 10 – Participants’ Vaccination status statistics as per questionnaire responses. Source: Authors own illustration (2024)**

The results show that just under half of the participants at 47.9% are fully vaccinated whilst 19.2% of the participants only took one dose and the 17.8% of the participants did not take the vaccine. For this study, the IMB skills model considers the expected health behaviour outcome to be “few active cases of COVID-19 among university community” and “high number

of fully vaccinated staff and students”. The results on table 10 above indicates that the participants had intention to achieve the expected health behaviour even though the 19% of them dropped out of the vaccination process.



**Figure 11 – Participants’ Vaccination status statistics as per questionnaire responses. Source: Authors own illustration (2024)**

For this study, statistics in Figure 11 above are interpreted as the results of the implemented DUT COVID-19 vaccination campaigns. Since 2023 there has been a decrease of the active vaccination campaigns both from the South African government and the case university. From the institution’s formal communication channels there are no specific repercussion for the unvaccinated staff and students. This may cause distrust and animosity between the university and its stakeholders. As such, the university might not be able to encourage staff and students to change their attitude, behaviour and cultural beliefs related to health crisis in future. In summary, the survey data analysis has offered valuable insights into the demographic characteristics of the participants, shedding light on their designation, gender, race, residential location, home language and participants’ vaccination statistics. This summary reveals the diverse nature of the surveyed group and provides important information that can have implications for various contexts.

#### **5.4. RELIABILITY**

The research questions were tested using the Kruskal Wallis test, Mann Whitney test and the Chi-square test of independence was used to highlight certain relationships that exist in the data. These statistics can then be used to identify certain influential variables and their impact on the choice of vaccination. For the research methodology to have any integrity, there is a need for the data quality to have the following characteristics: validity and reliability. The Cronbach’s alpha will be calculated for the questions that have the same scales. A value of

0.7 or higher is deemed to conclude a good internal consistency and reliability amongst the questions.

According to Coakes (2007: 140) “there are a number of different reliability coefficients”. One of the commonly used is the Cronbach’s alpha, which is based on the average correlation of items within a test if the items are standardised. If the items are not standardised, it is based on the average covariance among the items. The Cronbach’s alpha can range from 0 to 1. Cronbach’s alpha was also calculated as part of the reliability test to assess how consistent the results were, and we will we get similar results to generalise if we increased the sample size. A value of 0.7 or higher is a very good value that can lead us to say that we would get the same results if we carried out this survey with a larger sample of respondents. The Cronbach’s alpha was calculated for all the questions which have the same scales in each section.

QUESTION	CRONBACH’S ALPHA
Question 1.1	0.689
Question 1.2	0.676
Question 2	0.730
Question 3.1	0.751
Question 3.2	0.752
Question 3.3	0.753
Question 3.4	0.852
Question 4	0.786
Question 5	0.888
Question 6	0.783
Question 7	0.764

**Table 11 – Research questions tested to ensure reliability of questions for survey research instrument. Source: Authors own illustration (2024)**

The alpha values in Table 7 above seem fine indicating a good internal consistency. The questions included in a research instrument assisted the researcher to gather valuable insights from staff and students. The research questions were tested using the Kruskal Wallis test, Mann Whitney test and the chi-square test of independence to highlight certain relationships that exist in the data. These statistics were used to identify certain influential variables and their impact of COVID-19 vaccine communication on staff and students’ choice of vaccination at a South African university.

## **5.5. HYPOTHESIS TESTING**

Before we carry out any hypothesis testing, we test whether the questions or variables follow a normal distribution or not. The implication of normality is that if the variables/questions are normally distributed then parametric tests for example the independent sample t-test, Analysis of Variance (ANOVA) and certain parametric hypothesis tests will be permissible to use on the data. However, if the normality assumption is violated then nonparametric tests such as the Mann Whitney U test, Wilcoxon sign rank test and Friedman test, just to name a few are

allowed on the data to test certain hypotheses and infer results (Field and Miles 2010). Therefore, the Kolmogorov Smirnov test was used to test for normality on the data.

#### 5.5.1. KOLMOGOROV SMIRNOV TEST

H<sub>0</sub>: the tested variables come from a normal distribution.

H<sub>1</sub>: the tested variables do not come from a normal distribution.

At the 5% significance level, we reject H<sub>0</sub> for the questions whose p-values are less than 0.05 and conclude that the tested variables do not come from a normal distribution. The implication for this is that as far as the scores are concerned, we are required to use non-parametric statistics. Tests such as the Mann-Whitney U test, chi-square and the Kruskal Wallis test will be used if necessary. In this case since the p-values are all less than 0.05, we reject H<sub>0</sub> and conclude that we will use non-parametric tests on these questions for further analysis.

#### 5.5.2. Hypothesis Testing

##### 5.5.2.1. *Designation group*

H<sub>0</sub>: There is no difference between the designation group in the tested variables.

H<sub>1</sub>: There is a difference between the designation group in the tested variables.

At the 5% significance level, we will reject H<sub>0</sub> for all the questions whose p-values are less than 0.05 in q12d and conclude that there is a significant difference between the designation group in these tested variables whilst for the rest of the questions since their p-values are greater than 0.05 we will accept H<sub>0</sub> and conclude that there is no difference between the designation group in these tested variables.

##### 5.5.2.2. *Gender group*

H<sub>0</sub>: There is no difference between the gender group in the tested variables.

H<sub>1</sub>: There is a difference between the gender group in the tested variables.

At the 5% significance level, we will reject H<sub>0</sub> for all of the questions whose p-values are less than 0.05 (shaded above in table) and we conclude that there is a significant difference between the gender group in these tested variables whilst for the rest of the questions since their p-values are greater than 0.05 we will accept H<sub>0</sub> and conclude that there is no difference between the gender group in these tested variables. Since there was only one non-binary participant and the rest were classified as male and female, the Mann Whitney u test took precedence over the Kruskal Wallis test as only one participant will make the Kruskal Wallis test invalid.

#### 5.5.2.3. Residential location group

H<sub>0</sub>: There is no difference between the residential location group in the tested variables.

H<sub>1</sub>: There is a difference between the residential location group in the tested variables.

At the 5% significance level, we will reject H<sub>0</sub> for all of the questions whose p-values are less than 0.05 and conclude that there is a significant difference between the residential location group in these tested variables whilst for the rest of the questions since their p-values are greater than 0.05 we will accept H<sub>0</sub> and conclude that there is no difference between the residential location group in these tested variables.

#### 5.5.2.4. Language group

H<sub>0</sub>: There is no difference between the home language group in the tested variables.

H<sub>1</sub>: There is a difference between the home language group in the tested variables.

At the 5% significance level, we will reject H<sub>0</sub> for all of the questions whose p-values are less than 0.05 and conclude that there is a significant difference between the home language group in these tested variables whilst for the rest of the questions since their p-values are greater than 0.05 we will accept H<sub>0</sub> and conclude that there is no difference between the home language group in these tested variables.

#### 5.5.2.5. Chi-square test of independence – Research Objective 4: To determine COVID-19 vaccine information that influence staff and students' vaccination decision-making.

There are two Chi-square tests i.e. chi-square test of independence and chi-square goodness of fit test. The chi-square test of independence is often used to check for an association between the row and columns of a contingency table (Coakes 2007). The following hypotheses will be tested using the Chi-square test of independence. The reason that this test will be used is that if the responses are tending towards a certain category, say towards the “*Yes, I took the vaccine*” category rather than the “*No, I did not take the vaccine*” category with other tested variables then we can ascertain if certain factors have an impact on the participants' decision to take the vaccines based on the distribution of the responses within the question categories. The Chi-square test of independence uses a minimum of 5 frequency of responses per cell, if the assumption is violated then we make use of the Robust Chi-square test of independence.

H<sub>0</sub>: Decision to take the vaccine is independent of the tested variables or factors.

H<sub>1</sub>: Decision to take the vaccine is independent of the tested variables or factors.

**All the variables or factors were tested but only the significant variables are shown.**

- Home language
- Question 3.2a: The information was up to date/current
- Question 3.2b: The information was clear and easily understood
- Question 4.1b: Compare it with mass media communication – the media: TV, Radio and newspapers
- Question 4.1c: Compare it with the university’s official communication via website, statements and emails
- Question 5c: Effectiveness of the vaccine
- Question 5d: Availability of the vaccine
- Question 5e: Regulatory information
- Question 5g: Possible long-term side effects

At the 5% significance level, since the p-values are less than 0.05, we will reject H<sub>0</sub> and we conclude that the decision to take the vaccine is dependent or affected by *Home language, The information was up to date/current, The information was clear and easily understood, Compare it with mass media communication – the media: TV, Radio and newspapers, Compare it with the university’s official communication via website, statements and emails, Effectiveness of the vaccine, Availability of the vaccine, Regulatory information and Possible long-term side effects.*

## **5.6. RESULTS: PRESENTATION OF THE FINDINGS OF THE STUDY**

This section presents the results of the findings from the analysed data that were gathered through face-to-face interviews with staff who are lecturers and surveys that were administered to staff and students. The aim of this study is to investigate the impact of COVID-19 vaccine communication on staff and students’ choice to vaccinate against COVID-19 at a South African UoT. As discussed in Chapter 1, the identified problem is the lack of adherence to COVID-19 protocols, vaccine hesitancy and excess to external sources for COVID-19 related information. The theoretical framework in Chapter 2 and the Literature Review in Chapter 3 elaborated that this is a problem as it may result in the lack of adherence to the COVID-19 protocols, the verification of information is unknown, influences vaccine decision-making process, discourage vaccine acceptance and increase vaccine dropouts. Therefore, in this Chapter the four objectives of the study guided questions included in the research instrument for interviews (Attachment 7) and survey (Attachment 8). Not all questions in these research instruments are included in the results of the study as they are an extension or elaboration to the objectives of the study. However, they will assist the researcher with data for generating more academic articles in addition to this study that will be submitted as a formal doctoral thesis.

### 5.6.1. Interviews

The research instruments for interviews included questions that were guided by the four objectives of this study. Therefore, the findings will be presented per objective, include asked questions and identify overall findings gathered during in-depth interviews.

#### 5.6.1.1. *Objective 1: To identify communication channels used by DUT to create COVID-19 awareness among staff and students*

To achieve this objective, participants from the in-depth interviews were asked the following questions: “*Explain how DUT ensured that staff and students were made aware of the COVID-19 pandemic? How did DUT communicate information about COVID-19 vaccines to you?*”. Regarding the communication channels used by DUT to disseminate COVID-19 information, 73.3% of the participants mentioned the use of email communication by DUT as one of the primary communication channels to ensure that staff and students were made aware of the COVID-19 pandemic. 20% of the participants mentioned the utilisation of the PINBOARD system where DUT issued statements, while 13.3% mentioned the use of campus noticeboards and posters, although 20% of participants noted challenges with inconsistent or unclear communication regarding COVID-19. On the other hand, 13.3% of the participants appreciated the effectiveness of the DUT COVID-19 RTT communication efforts in providing timely and accurate information for staff and students.

Furthermore, the participants shared several key findings regarding how DUT communicated information about COVID-19 vaccines. The most common methods of communication were through emails and the PINBOARD system. Both email and PINBOARD were cited by two-thirds of the participants as the primary communication channel for disseminating vaccine-related information. Additionally, the DUT COVID-19 RTT organised workshops to address vaccine hesitancy and provide health expert perspectives on the virus. Although these workshops were not mandatory, they offered attendees an opportunity to learn more about the vaccines from health experts. Moreover, the institution utilised SMS messages to inform staff and students about the process of booking vaccination appointments.

Posters and campus noticeboards were also used to display vaccination-related information, and at least one participant mentioned seeing a nurse engaging with students to discuss vaccines, though it remains uncertain if she was part of the DUT staff. Despite the efforts made by the DUT COVID-19 RTT to convey COVID-19 information and vaccine information, few participants expressed disinterest or dissatisfaction with the communication approach concerning COVID-19 information, especially emails. Overall, the DUT COVID-19 RTT employed a multifaceted communication strategy that included emails, PINBOARD

statements, workshops, SMS messages and physical displays. Despite some challenges in engaging all recipients, the institution made frequent efforts to keep staff and students informed about COVID-19 vaccines, with both emails and PINBOARD statements being the most prominent communication channels.

5.6.1.2. *Objective 2: To explore staff and students' source for COVID-19 vaccine and vaccination information*

To achieve the research objective 2 of this study, the researcher asked the interviewees whether they used other sources to search information about COVID-19 vaccines and vaccination. The participants were asked: *“On a personal level, how did you get information about COVID-19 vaccines and vaccination?”* From the in-depth interviews, the participants mentioned the following sources: multiple sources, personal research, consultation with influential people and government updates. The analysis of how participants obtained information about COVID-19 vaccines and vaccination on a personal level shows a widespread reliance on diverse sources. These sources include TV news, radio, social media, health professionals' videos, academic articles and government updates. Many participants conducted personal research to gain a comprehensive understanding of vaccines and vaccination, while others sought guidance from medical professionals they trusted. The participants sought information from various sources, indicating a proactive approach to staying informed about COVID-19 vaccines. Personal research through academic articles and expert interviews played a significant role in decision-making. Trust in medical professionals and government updates influenced some participants' vaccination decisions. Overall, the participants' active approach to gathering information showcases their commitment to making informed decisions regarding COVID-19 vaccination.

5.6.1.3. *Objective 3: To explore the process used by staff and students to verify COVID-19 vaccine and vaccination information*

To achieve objective 3 of this study, the participants were asked: *“How did you verify any COVID-19 vaccine information sent to you by DUT?”*. The content analysis shows that participants used different approaches to verify COVID-19 vaccine information sent by DUT. A significant proportion of participants proactively sought external verification of information, indicating a strong preference for cross-checking details from multiple sources. While a notable percentage trusted the reliable sources cited by DUT, a sizable group did not prioritize verification or relied on limited external validation. Approximately 20% expressed confidence in the information provided by DUT when it came from established and reliable sources like

the WHO and the DoH. However, the majority (53.33%) placed a higher value on cross verifying the information from multiple external sources, such as news channels, health experts, scholarly articles and medical professionals. A smaller portion (26.67%) mentioned limited importance or no verification, relying on their trust in the university or the DoH.

5.6.1.4. *Objective 4: To determine COVID-19 vaccine information that influences staff and students' vaccination decision-making*

To achieve objective 4 of this study, the participants were asked: “*What type of information influenced your vaccination decision? How did the tools of communication used by DUT to communicate COVID-19 vaccine information influenced your vaccination choice? In your opinion, what type of information would you have wished to be shared regarding vaccination.*” These questions allowed the researcher to discover the type of COVID-19 information and vaccination information that influence staff and students' vaccination decision-making or factors that influences vaccine decision. The participants revealed that the desire to protect oneself and family members from COVID-19 was the most significant factor influencing vaccination decisions, with approximately 80% of the participants expressing this motivation. Information about COVID-19 side effects and safety, the mandatory vaccination policy imposed by the institution and uncertainty about vaccine-related information also played a role in influencing some participants' vaccination decisions. Other factors, such as trust in government and health authorities, the desire for travel and job security, misinformation and consideration of traditional medicine were less prevalent but still influenced vaccination decisions for some individuals. The data highlights the diverse range of influences that shaped the participants choices regarding COVID-19 vaccination, with protection for self and family being the most prominent and pervasive factor.

The analysis of the participants' views on how the tools of communication used by DUT influenced their vaccination decisions revealed a diverse range of factors, although some participants were not strongly influenced by DUT's communication tools as they had already decided to vaccinate. Moreover, other participants felt that the COVID-19 information from health experts and external sources played a role in their vaccination decision-making. For some, negative perceptions of vaccination being imposed by the institution impacted their vaccination decisions, while others mentioned the impact of job security and fear of losing their jobs. The regular reminders of active COVID-19 cases and deaths also contributed to some participants' decision to be vaccinated. Overall, the influence of DUT's communication tools on vaccination choices appears to be multifaceted and dependent on individual circumstances and perceptions.

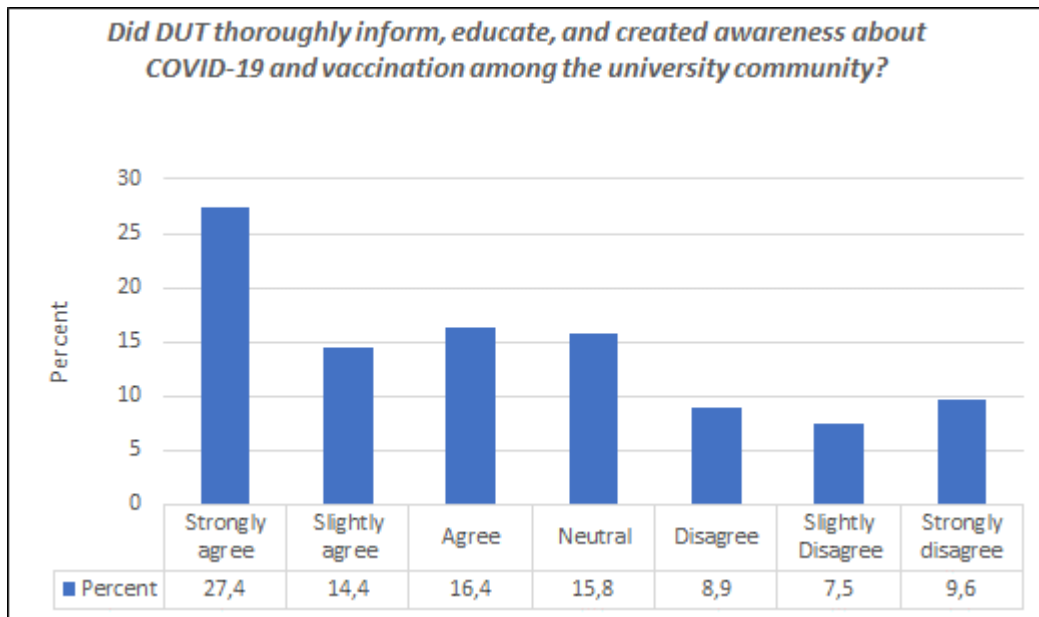
The participants shared valuable insights concerning the type of COVID-19 information they wished to have been shared regarding vaccination. They believed that the COVID-19 vaccine information that was not shared with them influenced their vaccination choice. Most participants expressed a desire for more comprehensive information about COVID-19 vaccine mechanics, body response and the pros and cons of vaccination. They also emphasised the need to address misinformation, debunk conspiracy theories and clarify myths surrounding the COVID-19 vaccine. Moreover, the participants' desired information specific to vaccine variants, long-term effects and access to different vaccines, along with comparative data. Few participants mentioned the importance of DUT aligning with government policies while considering the beliefs of staff and students. Furthermore, the participants expressed a wish for reassurance and transparency regarding the potential of COVID-19 vaccine side effects and complications, especially for people with chronic illnesses. Other participants mentioned the importance of addressing cultural beliefs and myths surrounding the COVID-19 vaccine.

#### 5.6.2. Questionnaires

The research instrument (questionnaires) for the administered online survey included questions that were guided by the four objectives of this study. Therefore, the results will be presented per objectives, include asked questions and identify overall findings generated from the provided questionnaire responses.

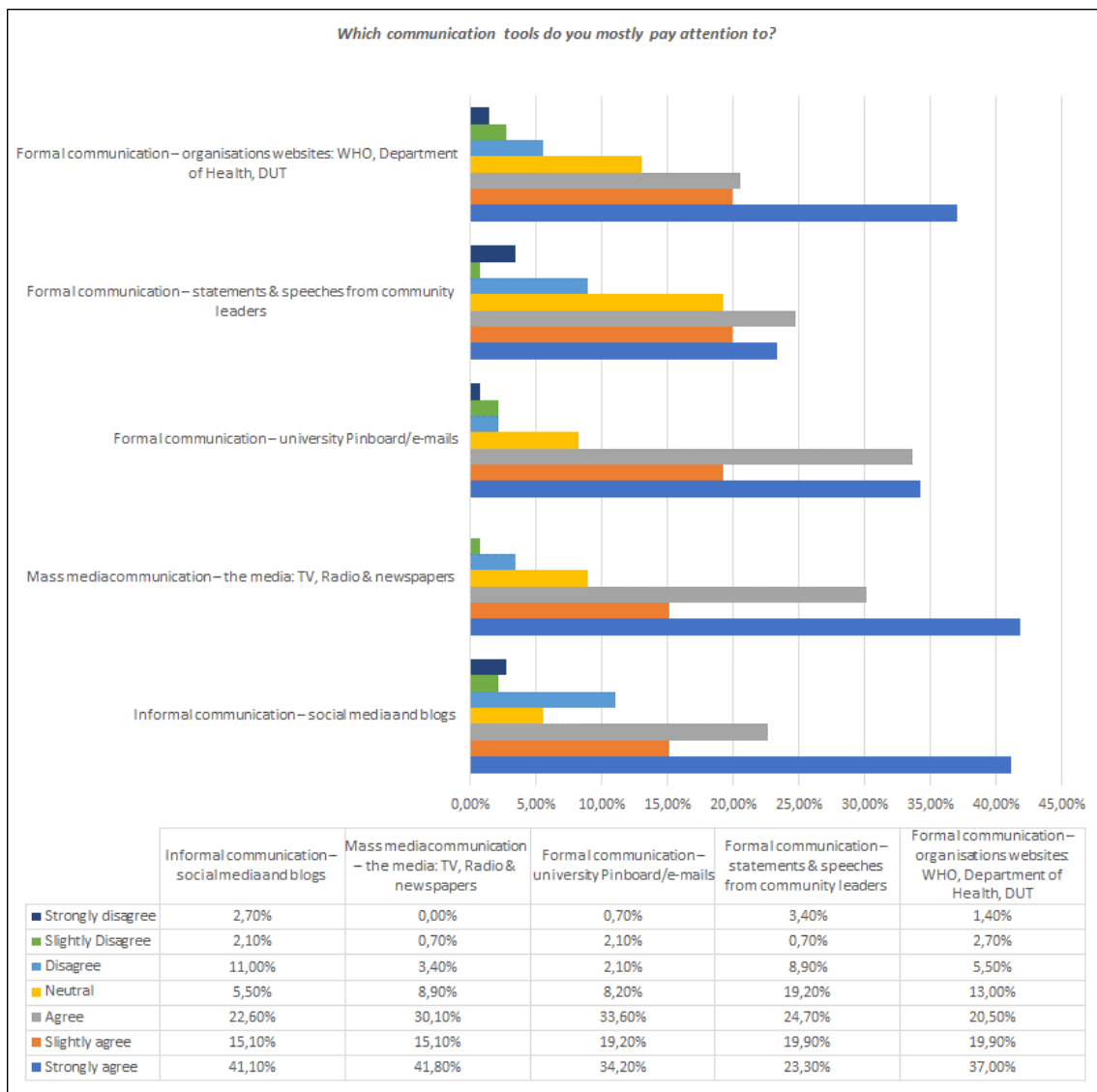
##### *5.6.2.1. Objective 1: To identify communication channels used by DUT to create COVID-19 awareness among staff and students*

To expand on the findings collected with in-depth interviews, the questionnaire included the questions “*Did DUT thoroughly inform, educate and created awareness about COVID-19 and vaccination among the university community?*”. The results in Figure 12 revealed that 60.2% of the participants agree that DUT did thoroughly inform, educate and created awareness about COVID-19 and vaccination among the university community.



**Figure 12 – Questionnaire responses indicating DUTs awareness efforts for COVID-19 and vaccination. Source: Authors own illustration (2024)**

The questionnaire responses revealed that 60.2% of the participants agree that DUT did thoroughly inform, educate and create awareness about COVID-19 and vaccination among the university community. Furthermore, the researcher asked, “*Which communication tools do you mostly pay attention to?*” In the modern era, communication has evolved into a multifaceted landscape, incorporating a myriad of communication channels that cater to diverse preferences. This analysis discovered staff and students’ inclinations towards various communication tools as revealed through Figure 13 below. The trends and patterns derived from data offer a holistic perspective on the communication channels preferences of the surveyed staff and students. In Figure 13, the data is categorised into five (5) distinct segments: informal communication through social media and blogs, mass media communication encompassing television, radio and newspapers, formal communication via university PINBOARD and emails, formal communication involving statements and speeches from community leaders and formal communication through organisational websites.



**Figure 13 – Questionnaire responses indicating communication tools that staff and students mostly paid attention to during the COVID-19 pandemic to be informed and updated. Source: Authors own illustration (2024)**

The above Figure 13 means that a significant 78.8% of participants expressed either strong agreement or agreement with engaging in informal communication channels like social media and blogs. The appeal of these platforms seems to stem from their interactive and dynamic nature, allowing staff and students to voice opinions, share experiences and to stay updated on current trends. However, a noteworthy 13.1% disagreed with the effectiveness of these tools, implying a degree of scepticism surrounding their credibility and authenticity. A substantial 87.0% of participants indicated agreement with paying attention to mass media communication, which includes traditional media like television, radio and newspapers. This resonance might stem from the established credibility, accessibility and widespread reach of these communication channels. The relatively low disagreement rate of 3.4% suggests a

certain level of consensus regarding the significance of mass media as a reliable source of information.

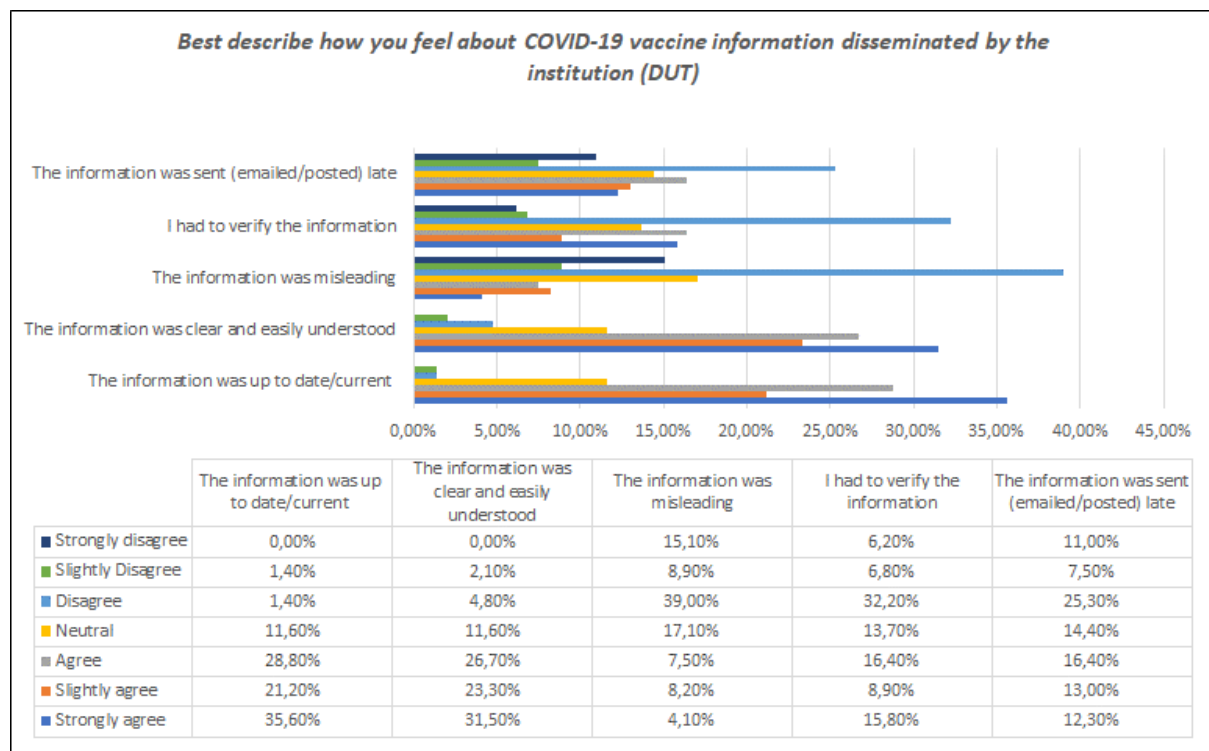
Formal communication channels at DUT, characterised by university emails and PINBOARDS solicited a mixed response from the survey response. Approximately 53.4% acknowledged the efficacy of these formal communication channels by either slightly agreeing or strongly agreeing with its relevance. Conversely, 12.5% adopted a neutral stance, potentially indicating that while these communication channels are employed by DUT, they might not always captivate the attention of the intended recipients which are staff and students. The contrast of agreement and neutrality showcases the complex landscape of communication in academia.

Formal communication channels facilitated through statements and speeches from community leaders collected varied responses from staff and students. Agreement accounted for 43.2% of participants, representing a considerable number of staff and students that values the insights and direction provided by these influential figures. Nevertheless, the 19.2% sizeable neutral response underscores a divergence in opinions, suggesting that community leaders' communication might not resonate equally with all staff and students. The appearance of an 8.9% disagreement rate highlights dissenting voices in this segment.

Communication through organisational websites received significant consideration, with 77.4% of participants endorsing its effectiveness. Organisations such as the WHO and the DoH serve as credible sources of information, evidenced by the high agreement rate. This corresponds with views of interviewed participants who mentioned the use of 'official website' to research more about COVID-19 and vaccine information. Notably, 13.0% expressed neutrality, potentially hinting at the need for these websites to continually enhance their accessibility and user-friendliness. The presence of disagreement (5.5%) reinforces that no formal communication channel is generally preferred.

From these findings, it is evident that the communication is broad and has a variety of channels preferred by staff and students. The findings highlighted the highly preferred use of informal communication channels through social media and blogs, followed by using mass media and the mixed reactions to formal communication channels such as university emails and PINBOARDS, community leaders' speeches and organisational websites. As staff and students navigate this complex web of communication channels, it is crucial for DUT to grasp these preferences and tailor their communication strategies accordingly. Ultimately, this analysis captures the intricate interplay between individual inclinations and the array of tools shaping the modern communication milieu.

To conclude on the theme of communication channels employed by DUT to disseminate COVID-19 information, one of the questions asked in a questionnaire were: *Best describe how you feel about COVID-19 vaccine information disseminated by the institution (DUT)*. Amid the global COVID-19 pandemic, accurate and transparent information dissemination about vaccines has become paramount. This study probes into how staff and students perceive the COVID-19 vaccine information disseminated by the institution (DUT) as reflected in the responses to five key questions. The data presented in the form of frequency tables in Figure 14 below with percentages, reveals a complex perspective on the effectiveness of DUT’s communication.



**Figure 14 – Questionnaire responses indicating how they felt about COVID-19 vaccine information that they received from the case university. Source: Authors own illustration (2024)**

Based on the above Figure 14, when analysing the data from “*The information was up to date/current*”, it is evident that a substantial proportion of participants, 81.5% expressed agreement or slight agreement with the COVID-19 vaccine information provided by DUT. This suggests a generally positive reception of the institution’s communication efforts. Notably, only 7.9% of the participants expressed disagreement, signifying a relatively small proportion of individuals with concerns or dissenting opinions. Conversely, the question: “*The information was misleading*” provides insights into a challenge faced by DUT in its vaccine information dissemination which showed that a significant 54.1% of participants voiced their disagreement with the institution's messaging. This low agreement rate raises questions about the

effectiveness of the communication strategy, highlighting the need for introspection and potential reforms in addressing concerns and improving transparency.

The Question: *“I had to verify the information paints a more nuanced picture”*, showcased varying levels of agreement with DUT’s COVID-19 vaccine information. While 40.7% of participants agreed or slightly agreed with the provided information, a considerable 38.2% expressed disagreement. This divergence underscores the complexity of staff and students’ perceptions, indicating that the institution's messaging resonates differently with different segments of the population.

The data from question: *“The information was sent (emailed/posted) late”* portrays a balanced viewpoint among the participants. A total of 41.7% expressed agreement with DUT's COVID-19 vaccine information, while 32.8% held a contrary perspective. This balance highlights the importance of catering to a diverse audience, accommodating varying levels of knowledge, beliefs and concerns surrounding the COVID-19 vaccine.

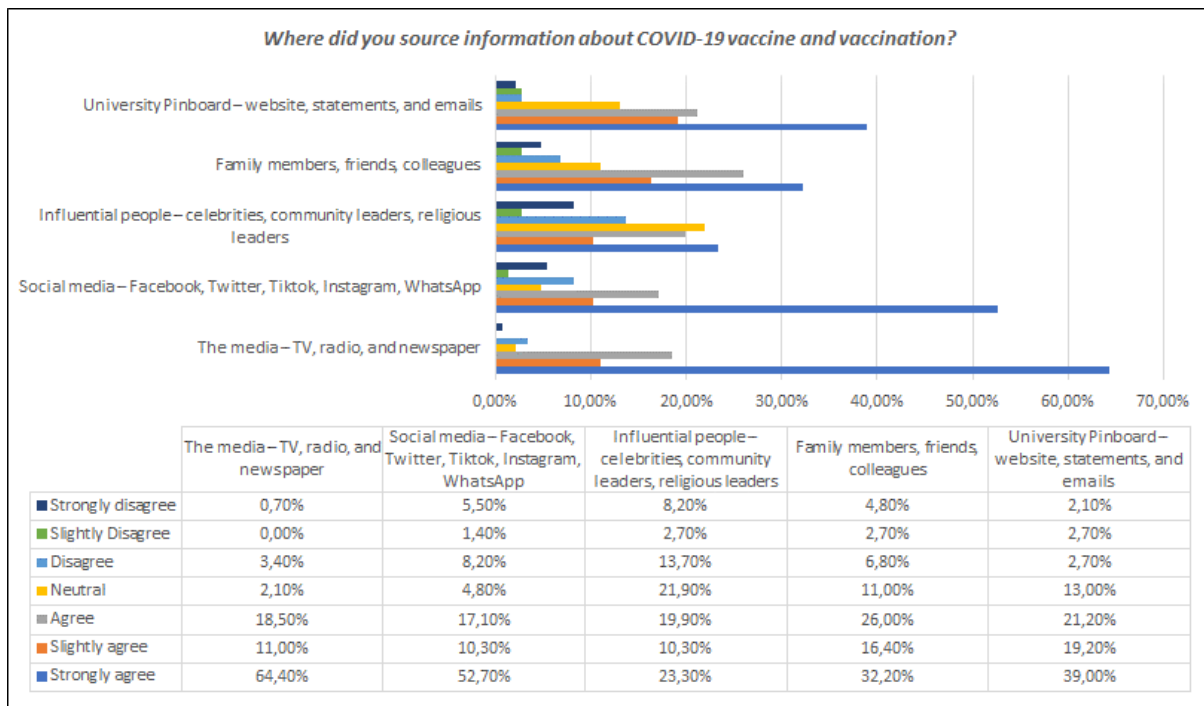
The findings of this analysis have several implications for DUT’s communication strategy. The positive agreement levels observed in *“The information was clear and easily understood”* validate the institution's efforts in conveying accurate and persuasive COVID-19 vaccine information. This success might be attributed to factors such as clear messaging, accessible platforms and a transparent approach.

However, the significant levels of disagreement observed in: *“The information was misleading”* and *“I had to verify the information”* warrant attention. The institution must recognise that communication effectiveness is not solely measured by the number of agreements, but also by the quality of engagement with dissenting voices. These participants’ concerns should be acknowledged and addressed to foster a more inclusive and informed public dialogue.

Furthermore, the balanced responses in: *“The information was sent (emailed/posted) late”* emphasize the need for adaptability. DUT’s communication strategy should be versatile, catering to varying levels of knowledge and viewpoints. Providing clear, comprehensive and approachable information through diverse communication channels could mitigate potential misinformation and strengthen trust among the university community.

5.6.2.2. *Objective 2: To explore staff and students’ source for COVID-19 vaccine and vaccination information*

The questionnaire had a follow-up question to expand on the themes emerging from the in-depth interviews about the sources of COVID-19 vaccine and vaccination information. The participants were asked “*Where did you source information about COVID-19 vaccine and vaccination?*”. The data below present insights into the sources from which individuals have obtained information about COVID-19 vaccines and vaccination. A total of 146 participants participated in the survey, expressing their views on various platforms. See Figure 15 below:



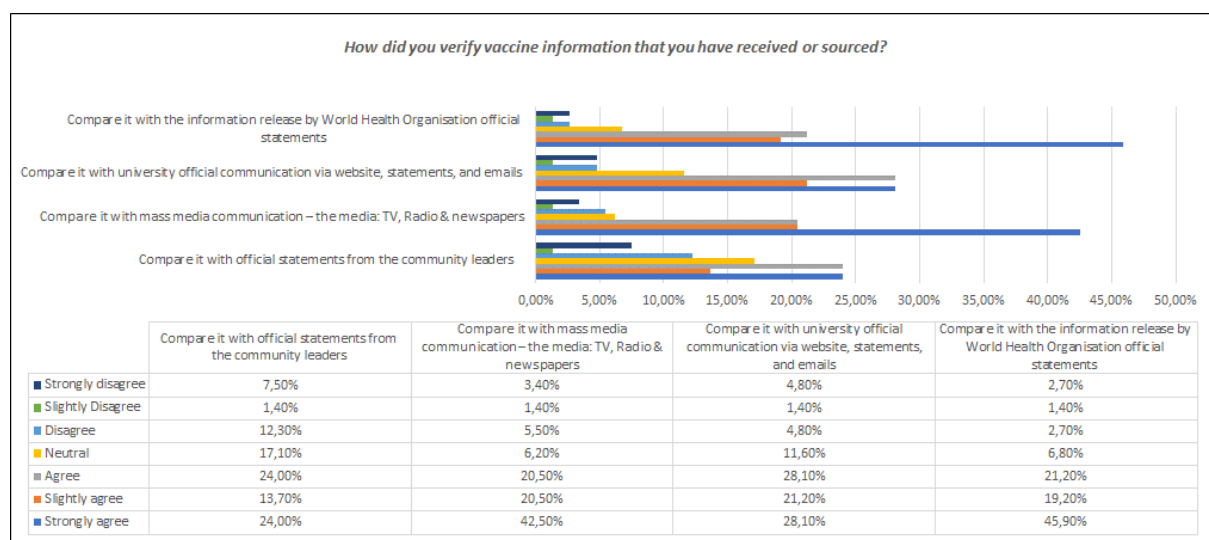
**Figure 15 – Questionnaire responses indicating sources for COVID-19 vaccine and vaccination information. Source: Authors own (2024)**

To summarise the data presented from Figure 15 above: Most of the participants (64.4%) strongly agreed that they sourced information about COVID-19 vaccines and vaccination from traditional media sources such as TV, radio and newspapers. Additionally, 11% slightly agreed, 18.5% agreed and a combined 5.1% disagreed or strongly disagreed with this source. Only 2.1% remained neutral. Approximately 52.7% of the participants strongly agreed that they acquired information through social media platforms like Facebook, Twitter, TikTok, Instagram and WhatsApp. Meanwhile, 10.3% slightly agreed, 17.1% agreed and 15.1% expressed disagreement in varying degrees. Around 4.8% remained neutral. Regarding influential individuals such as celebrities, community leaders and religious figures, 23.3% strongly agreed that they were a source of information on COVID-19 vaccines and vaccination. Furthermore, 10.3% slightly agreed, 19.9% agreed and 27.9% held neutral views. The disagreement was evident in varying degrees among 13.7% of the participants.

In terms of personal connections, 32.2% strongly agreed that family members, friends and colleagues were instrumental in providing them with information about COVID-19 vaccines and vaccination. Additionally, 16.4% slightly agreed, 26% agreed and 9.5% disagreed in different intensities. About 11% remained neutral. Among the participants, 39% strongly agreed that they relied on university pinboards (websites, statements and emails) to obtain information about COVID-19 vaccines and vaccination. Furthermore, 19.2% slightly agreed, 21.2% agreed and 5.4% disagreed in varying magnitudes. Approximately 13% remained neutral.

5.6.2.3. *Objective 3: To explore the process used by staff and students to verify COVID-19 vaccine and vaccination information*

In an era marked by a surge of information, discerning the veracity of vaccine-related information has become a critical task. The study at hand delves into individuals' methods of verifying vaccine information that they receive or source, comparing their perspectives across different sources. The analysis of the data reveals intriguing patterns that shed light on how people navigate the landscape of vaccine information. One of the questions included in a questionnaire were: *How did you verify vaccine information that you have received or sourced?* Figure 16 below shows participants' response variations from 'strongly agree' to strongly disagree'.



**Figure 16 – Questionnaire responses indicating the sources used by participants to verify COVID-19 vaccine information that they received or sourced. Source: Authors own illustration (2024)**

In Figure 16 above, the questionnaire encompassed four primary comparisons: community leaders' statements, mass media communication (TV, radio and newspapers), university

official communication (website, statements and emails) and information from the WHO. Each source was rated on a spectrum ranging from 'Strongly Disagree' to 'Strongly Agree'. One notable observation is the variation in response distribution across the different sources.

Community leaders' statements emerged as a source that prompted diverse opinions. While a substantial proportion of participants agreed with using this source for verification (24.0% agreed, 13.7% slightly agreed), a comparable number of the participants expressed scepticism (12.3% disagreed, 7.5% strongly disagreed). This range of sentiment suggests that community leaders' statements may not consistently garner universal trust, implying a potential need for more coherent communication strategies in this domain.

Mass media communication comprising mediums like TV, radio and newspapers exhibited a higher level of trust. A significant number of participants (42.5%) strongly agreed with using mass media for verification, indicating its substantial influence. The overall positive sentiment towards mass media's role suggests that these platforms remain pivotal in shaping perceptions of vaccine information.

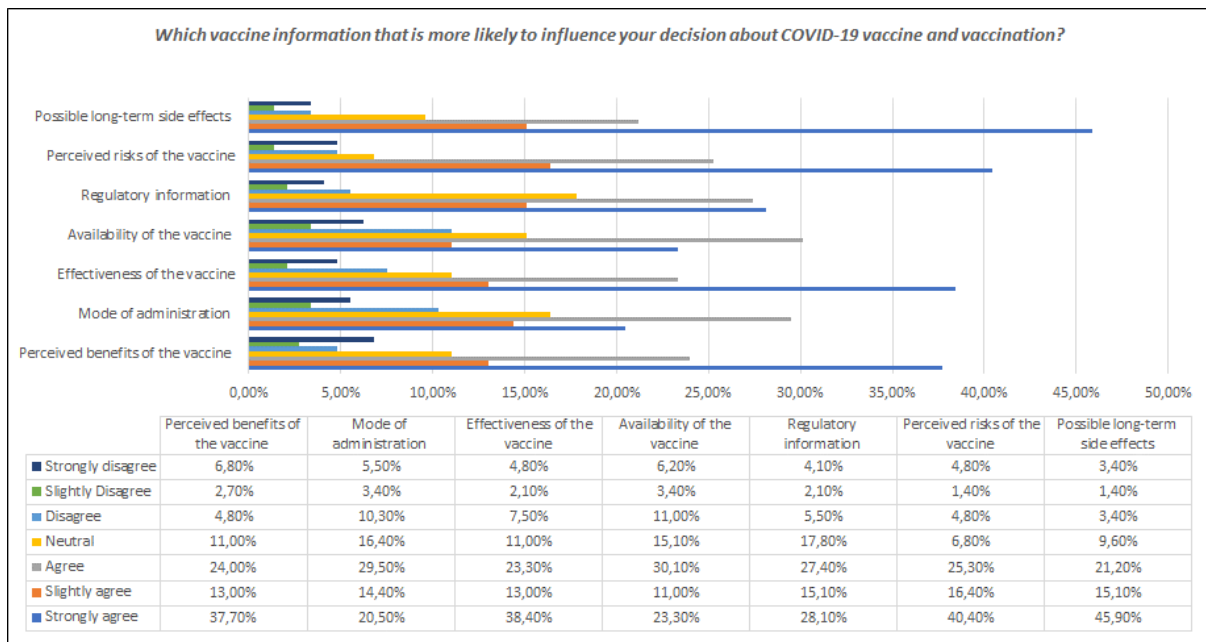
The university's official communication channels displayed a relatively balanced distribution of opinions, with participants moderately trusting this source. Approximately half of the participants (28.1% strongly agreed, 21.2% slightly agreed) found university channels suitable for verification. However, it is crucial to note that a smaller but still notable portion of participants expressed disagreement (4.8% disagreed, 4.8% strongly disagreed). This signifies that while universities are considered reliable by many, efforts may be needed to bolster the credibility of this information source for the entire population.

The WHO statements garnered the highest level of trust for vaccine information verification. A considerable majority of the participants (45.9% strongly agreed, 19.2% slightly agreed) endorsed the use of the WHO's official statements. This remarkable consensus underscores the global reputation and credibility that the WHO has cultivated in the field of public health.

#### *5.6.2.4. Objective 4: To determine COVID-19 vaccine information that influences staff and students' vaccination decision-making*

In the landscape of global health, the search for accurate and reliable information has become an integral part of making informed decisions, especially in the context of the COVID-19 vaccine. This study probes into the factors that individuals consider when making decisions about the COVID-19 vaccine, shedding light on the multifaceted influences that guide their choices. The analysis is based on a comprehensive display of factors, each contributing to the

complex vaccination decision-making process. To probe more on type of COVID-19 vaccine information that might influence participants vaccination choices, one of the questions included in the questionnaire was: “Which vaccine information is more likely to influence your decision about COVID-19 vaccine and vaccination?”. The Figure 17 below presents data with following ‘influences’: possible long-term effects, perceived risks of the vaccine, regulatory information, availability of the vaccine, effectiveness of the vaccine, mode of administration and perceived benefits of the vaccine.



**Figure 17 – Questionnaire responses indicating vaccine information that is more likely to influence their vaccination decisions. Source: Authors own illustration (2024)**

The data from Figure 17 is narrated as follows:

The perceived benefits of the vaccine emerged as a pivotal factor in shaping staff and students’ vaccination choices. A significant portion of participants (37.7%) strongly agree that the potential advantages of the vaccine impact their choice, while an additional 24.0% of the participants express agreement. The inclination towards perceived benefits suggests that staff and students are inclined to prioritise their own well-being, considering the use of vaccines to achieve health security.

The mode of the administration of the vaccine also plays a substantial role in influencing decisions. While a moderate number of participants agree (29.5%) and slightly agree (14.4%) that the mode of administration affects their choice, a significant percentage remains neutral (16.4%). This division of opinion highlights the importance of clear and effective communication about the administration process.

The effectiveness of the vaccine stands out as another prominent factor. A substantial portion of participants (38.4%) strongly agree that the vaccine's effectiveness is a determining factor in their decision-making process. This response signifies that staff and students are placing a high premium on scientific evidence supporting the vaccines' efficacy.

The availability of the vaccine emerges as a notable influencer, with the participants factoring in accessibility into their decisions. A considerable percentage (30.1%) of the participants agree that vaccine availability affects their choice. This result underlines the importance of equitable distribution strategies to ensure that all segments of society can access the vaccine, regardless of geographical location or socio-economic background.

The regulatory information pertaining to vaccines also play a role, with 28.1% of the participants strongly agreeing that the regulatory information influences their decisions. Trust in the regulatory process signifies a reliance on established protocols and standards to ensure vaccine safety and effectiveness.

The perceived risks of the vaccine are notably a significant consideration. With a substantial percentage 40.4% of the participants strongly agrees that perceived risks influence their decisions, indicating the prevalence of risk aversion.

The possible long-term side effects also play a role in influencing decisions. 45.9% of the participants strongly agrees that the possible long-term side effects factor into their choices. This finding underscores the need for long-term safety monitoring and proactive communication to address concerns about potential delayed adverse effects after vaccinating.

### 5.6.3. Overall results of the study

This study used both qualitative and quantitative methods to collect data. It is important to indicate whether the results correlate or are in dispute. A summary of the findings per objectives will be discussed below by identifying the overall results from both survey and interviews.

#### 5.6.3.1. Objective 1

The overall results for objective 1 in terms of communication tools are emails and DUT's Pinboard statements; campus noticeboards and posters, workshops and online meetings; websites and mobile apps and SMS. The DUT used these communication channels to create COVID-19 awareness among the university community. However, there were participants that labelled DUT's communication approach as inconsistent and that the communication was unclear. Other participants appreciated DUT's effort to communicate effectively. The

questionnaire responses correlate with the interview results because most of the participants through questionnaires agreed that the university thoroughly informed, educated and created awareness about COVID-19 and vaccination among the university community. The questionnaire results indicates that staff and students also paid attention to informal communication channels such as social media. Moreover, over half of the submitted responses agreed with the efficacy of the formal communication channels which correlate with the interview findings.

The data analysis offers a comprehensive perspective on how staff and students perceive the COVID-19 vaccine information disseminated by DUT. While a substantial proportion agrees with the institution's efforts, challenges remain in addressing dissenting viewpoints and catering to diverse perspectives. By enhancing transparency, addressing concerns and maintaining a flexible communication approach, DUT can better navigate the complex landscape of COVID-19 vaccine information dissemination, contributing to informed decision-making and the public health of staff and students.

#### 5.6.3.2. *Objective 2*

The overall results for objective 2 in terms of sources for COVID-19 vaccine and vaccination information are personal research sources and government updates and university pinboard. Through personal research, the interviewed participants explored multiple sources such as TV news, radio, social media, health professionals' videos, academic articles and government updates. Their main goal was to be more informed before taking vaccine decisions. This correlate with the questionnaire results and data analysis offers a full understanding of diverse sources from which staff and students gathered information about COVID-19 vaccines and vaccination. Traditional/mass media, social media, influential people, personal connections and university communication channels emerged as key platforms. Strong and varied levels of agreement were observed across these sources, with some participants expressing neutrality or disagreement. This highlights the importance of a multifaceted approach to disseminating accurate and reliable information in the context of a global health crisis.

#### 5.6.3.3. *Objective 3*

The overall results for objective 3 in terms of verification of COVID-19 vaccine and vaccination information are no verification needed and external sources verification. In a broader context, these findings emphasise the multifaceted nature of information verification. The diversity of opinions regarding different sources highlights the nuanced decision-making process that individuals undergo. Both interview and questionnaire results correlates. It is evident that participants explored a combination of sources, a reflection of the intricate web of information they navigate in their pursuit of reliable vaccine-related facts. The data from the questionnaires

underscores the complex interplay of trust, credibility and information channels in the realm of vaccine information verification. While certain sources, like the WHO and mass media command substantial confidence, other channels exhibit a wider array of opinions. These insights provide valuable guidance for stakeholders involved in disseminating vaccine information, emphasising the need for transparent, coherent and credible communication strategies to empower staff and students in making informed decisions about vaccination.

#### *5.6.3.4. Objective 4*

The overall results for objective 4 in terms of COVID-19 vaccination decision-making are uncertainty and perceived risks, mandatory policy and the lack of choice, trust in official health communication and comparison with traditional medicine. The COVID-19 vaccine decision-making process is a complex interplay of various factors, each with its own unique weight. The results for the interviews and the questionnaire correlates as they both emphasise the impact of vaccine communication. The perceived benefits and effectiveness of the vaccine are prominent motivators, highlighting the importance of clear communication around these aspects. The findings stress the necessity of transparent and accessible information dissemination, bridging gaps in understanding and addressing concerns. To navigate this intricate landscape successfully, public health communication strategies must be adaptive, comprehensive and tailored to address the diversity of factors influencing individual vaccination choices.

## **5.7. CONCLUSION**

The interviewed participants were staff working as lecturers from the three departments. Their biographical information recorded their gender, race, age, residential location, home language and their departments. Their characteristics revealed that they come from different backgrounds, which contributed positively to the findings from the data collected. The biographical information obtained from this survey paints a comprehensive picture of the surveyed population demographics and characteristics. To assess the reliability of the study, the research questions were tested using the Kruskal Wallis test, Mann Whitney test and the Chi-square test of independence was used to highlight certain relationships that exist in the data. To ascertain the validity and reliability of the study, the Cronbach's alpha was calculated for research questions to ensure the integrity of research methodology. This study tested whether the questions or variables follow a normal distribution or not before hypothesis testing. The hypothesis was tested for designation group, gender group, resident location group and language group. Furthermore, other hypotheses were tested using the Chi-square test of independence. The data results presented were gathered from the in-depth interviews and questionnaire completed through online survey, which was then analysed and the overall results were identified per the four objectives. These results are categorised as themes per

objectives as follows: employed communication channels, sources for COVID-19 vaccine and vaccination information, verification of COVID-19 vaccine and vaccination information and factors influencing COVID-19 vaccination decision-making. These themes were identified with the link to the research topic, research aim, research problem and research objectives. Moreover, correlation or disputes of the presented results was discussed, including the vaccination status of the participants. The triangulation analysis aimed to produce conclusions drawn from both methodologies; namely, qualitative (interviews) and quantitative (surveys). Therefore, the triangulation presented common trends regarding DUT COVID-19 response strategies, DUT COVID-19 vaccine communication and DUT COVID-19 prevention strategies. The next chapter will discuss the findings of this study per objective.

## CHAPTER 6

### DISCUSSION OF RESEARCH FINDINGS

#### 6.1. INTRODUCTION

All research findings presented in the previous chapter will be discussed in themes with quoted texts and tables in this chapter. The research findings are guided by the four (4) objectives of this study; namely:

- a. Objective 1: Employed Communication Channels
- b. Objective 2: Sources for COVID-19 Vaccine and Vaccination Information
- c. Objective 3: Verification of COVID-19 Vaccine and Vaccination Information
- d. Objective 4: Factors Influencing COVID-19 Vaccination Decision-Making

To conclude this chapter, the triangulation will be drawn from both qualitative (interviews) and quantitative (questionnaires) analyses from the findings gathered at the case university pertaining to COVID-19 vaccine communication and its impact on staff and students' vaccination decisions.

#### 6.2. OBJECTIVE 1: EMPLOYED COMMUNICATION CHANNELS

##### 6.2.1. Introduction

The first objective of this study is to identify communication channels used by DUT to create COVID-19 awareness among staff and students. This objective aims to explore how the case university created COVID-19 awareness among the university community by exploring the communication channels used by COVID-19 RTT to communicate information related to COVID-19 and vaccines with staff and students. Furthermore, this objective aims to assess the efficacy of disseminated DUT COVID-19 vaccine communication by the case university's COVID-19 RTT to influence staff and students' vaccine decisions. The themes that emerged pertaining to this objective are as follows:

Theme 1	Emails and PINBOARDS statements
Theme 2	Campus Noticeboards and posters
Theme 3	Workshops and online meetings
Theme 4	Website and Mobile App
Theme 5	SMS

Staff and students have access to a variety of communication channels or tools that they use to interact, exchange information and for passing messages (Ansari and Khan 2020). HEIs

need to understand which communication tools are frequently used by their staff and students so that those communication tools can be used as one of the primary formal communication channels by universities. An understanding about preferable communication tools by staff and students can be used by HEIs to develop and implement effective COVID-19 response strategies and COVID-19 vaccine communication strategies (Hashim, Rashid and Atalla 2018; Aleksandrova and Parusheva 2019).

#### 6.2.2. Theme 1: Emails and PINBOARDS statements

Most interviewed participants mentioned that DUT utilised emails and PINBORAD statements as one of the primary formal communication channels to update staff and students about the COVID-19 pandemic. The below excerpt emerged from the interviewee's response related to DUTs formal communication channels employed to create COVID-19 awareness among staff and students:

*“Via DUT PINBOARD, there were statements with COVID-19 latest information. These statements updated us about the number of people infected (staff and students), people who died and those who recovered.” (P1)*

*“DUT issued statements that they used to release each week when they updated us with statistics information of people have been affected, how many we have lost. I was aware of the COVID-19 pandemic from those statements. When we were in lockdown, I constantly checked emails, and it was sad when you read those statements and found out how many colleagues have died.” (P7)*

During lockdown, the case university had systems in place to curb the spread of the COVID-19 disease. Even though lockdown was nationally instituted, DUT suspended on campus classes to adhere to the government and international COVID-19 protocols. The institution communicated through emails, PINBOARD and their statement was published as an online article in Independent Online (IOL) website under *The Mercury* newspaper on the 16<sup>th</sup> of March 2020 (IOL 2020). The participants praised the institutions' effort for create COVID-19 awareness and the participants recalled that:

*“There was a good effort from the institutions side to communicate and create awareness around COVID-19 and there was the testing that was set in place and the information was communicated to us and then there was an influx of emails that we were receiving reminding us to adhere to the COVID-19 protocols.” (P5)*

*“They were (DUT) very effective in sending emails about COVID-19 awareness. I was impressed about COVID-19 Response Task Team and how they were informing the university community and creating awareness about COVID-19. The most information I read from the emails was current and updated.” (P10)*

*“I think that the DUT COVID-19 Response Task Team did an exceptional job. The reason why I'm saying this is because you would*

*receive information on your e-mail on a weekly basis, giving you updates as to what is currently happening, which is a practice that was not adopted before COVID-19. So, if then we had such information or such a platform where we would get updated about health issues or any other thing that is currently happening pertaining to the health issues it would make more impact in terms of creating awareness. I think that the COVID-19 Response Task Team did a great job about creating that kind of awareness and you would see what is currently happening around you even if you are not even on campus, you would check your emails and updates regarding the status of COVID-19 around the campus and statistics.” (P12)*

Based on the participants experiences, the institutions effort to raise COVID-19 awareness is in line with the information construct of the IMB skills model. The information construct emphasises the need for health experts and organisations to provide specific information about the disease and educational information about how individuals should behave or protect themselves from the disease (Misovich et al. 2003).

The questionnaire responses in Table 12 below elaborated that the case university thoroughly informed, educated and created COVID-19 awareness among the university community.

<i>Did DUT thoroughly inform, educate, and created awareness about COVID-19 and vaccination among the university community?</i>		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	40	27.4	27.4	27.4
	Slightly agree	21	14.4	14.4	41.8
	Agree	24	16.4	16.4	58.2
	Neutral	23	15.8	15.8	74.0
	Disagree	13	8.9	8.9	82.9
	Slightly Disagree	11	7.5	7.5	90.4
	Strongly disagree	14	9.6	9.6	100.0
	Total	146	100.0	100.0	

**Table 12 - Questionnaire responses citing COVID-19 awareness among the university community. Source: Authors own illustration (2024)**

However, critiquing the DUT’s COVID-19 RTT, the interviewed participant claimed that:

*“Staff and students were aware, but there was confusion, because when we went to lockdown there was no clear indication when we would be back at work. The DUT COVID-19 Response Task Team, I just felt like they were good on paper. The communication sent to us was very inconsistent, and it was written in such a way that it wasn’t clear, I wished they used simple language and not send us essays.” (P11)*

In a situation narrated above, Shanahan *et al.* (2023) recommends the use of visual narrative messages to encourage COVID-19 vaccine uptake as a strategy for more effective risk

communication approaches. Furthermore, several participants mentioned receiving frequent information about COVID-19 vaccines through emails and PINBOARD statements.

*“I received the information through emails.” (P8)*

*“The institution sent us emails.” (P10)*

Furthermore, the interviewed participants mentioned the use of a combination of emails and PINBOARD statements because the DUT COVID-19 Task Team issued statements and updates related to COVID-19 vaccine and vaccination information. The participant narrated that:

*“There was a communication about administering the vaccines and I do recall that the institution even had a day on Thursday that was dedicated vaccination at the campus clinics. I remember one of the days, they had a campaign headed by the clinic they called it Vaccination Thursday, it is still active in Durban campuses. They communicated quite frequently, so meaning that even if you had missed previous communication, you will be able to be updated.” (P5)*

*“There were statements issued about vaccination, they were sent via emails and PINBOARD. And I think that for sure every second day you'll be receiving it. And if you're lucky every second hour, you'll be receiving emails about vaccine, where to find vaccination stations, etc.” (P6)*

*“I think the indication from the institution was dependent on the government because they were the ones driving the response strategies for the whole country. All information that the institution sent us was based on government response strategies.” (P13)*

*“I had access to emails and PINBOARD statements, the information was sent there”. (P12)*

During the interviews the PINBOARD statements were frequently mentioned as a formal communication channel used by DUT to communicate vaccine related information. The findings of the study by Kartikawangi and Dahesihsari (2020) affirmed that during the COVID-19 pandemic most participants used formal communication and minimised informal communication.

Furthermore, the institution seemed to use the same emails and DUT PINBOARD that they used to disseminate the information about the COVID-19 outbreak for vaccine communication. Alluding to the use of emails and DUT PINBOARD statements for COVID-19 vaccination related information, the participants said:

*“The same way that they made us aware that there is COVID-19, they sent statements with details of where and when to vaccinate and how many shots we needed to be fully vaccinated.” (P7)*

*“When I received my laptop back, I went through emails and I noticed that the institution emailed something about vaccines, but I was already vaccinated so I didn't really pay much attention to it.” (P9)*

The questionnaire responses in Table 13 below alluded and provided evidence that the COVID-19 vaccine related information sent by the institution through emails and PINBOARD statements was current, clear and easily understood.

<i>Best describe how you feel about COVID-19 vaccine information disseminated by the institution (DUT)</i>	Strongly agree	Slightly agree	Agree	Neutral	Disagree	Slightly Disagree	Strongly disagree
The information was up to date/current	35.6%	21.2%	28.8%	11.6%	1.4%	1.4%	0.0%
The information was clear and easily understood	31.5%	23.3%	26.7%	11.6%	4.8%	2.1%	0.0%
The information was misleading	4.1%	8.2%	7.5%	17.1%	39.0%	8.9%	15.1%
I had to verify the information	15.8%	8.9%	16.4%	13.7%	32.2%	6.8%	6.2%
The information was sent (emailed/posted) late	12.3%	13.0%	16.4%	14.4%	25.3%	7.5%	11.0%

**Table 13 - Questionnaire responses that describes how participants felt about COVID-19 vaccine information disseminated by the DUT COVID-19 Response Task Team. Source: Authors own illustration (2024)**

The above Table 13 is affirmed by comments from the interviewed participants below, where participants are indicating how they accessed the emails and PINBOARD statements to be updated about COVID-19 pandemic, with vaccine information and vaccination. The participants narrated that:

*“During COVID-19 they certainly did issue out a whole lot of information. While we were on lockdown, there were constant emails and communication around COVID-19 and what to do to protect ourselves. DUT had Wellness programmes for people who were experiencing high stress levels to try and help them. You could meet with a psychologist virtually to take you through coping mechanisms.” (P3)*

*“Through emails and issuing statements on PINBOARD.” (P4)*

*“Through emails and PINBOARD and campaigns that I have seen on campus.” (P6)*

*“I wasn’t on campus at that time, but I received emails encouraging us to be safe, wear mask, practise social distancing and use sanitizer.” (P8)*

*“By sending emails, and PINBOARD communique.” (P14)*

Even though the institution informed staff and students about the availability of vaccines and operational vaccination stations, a participant claimed that the institution did offer vaccination stations for staff and students in their Midlands Campuses which are Indumiso Campus and Riverside Campus. The participant posited that:

*“We were receiving those weekly emails from the COVID -19 RESPONSE TASK TEAM updating us. We received COVID-19 vaccine information through emails and PINBOARDS. Then obviously, if you're in Durban campuses, it was easier to get vaccination. But in the Midlands campuses we were sort of neglected and left to fend for ourselves.” (P2)*

The above assumption stems from the temporary vaccination station that was set up at Indumiso Campus, which only operated for 10 days in September 2021 (DUT 2021d). The comments above made by P2 implies that the institutions’ efforts were not enough and did not meet every need of staff and students in the Midlands campuses.

The email communication seemed to be a common method used by the institution, however, some participants were not satisfied with emails as a primary communication channel for staff and students and did not pay much attention to it. The participant recalled that:

*“They sent emails, but I was bored and fed up with the way the so-called DUT COVID-19 Response Task Team was communicating, I didn’t even open it. Even when there was a vaccine rollout, I didn’t open those emails.” (P11)*

This above comment from the interviewee provides an indication as to why few staff and students paid attention to informal communication channels (social media and blogs), mass media communication (TV, radio and newspapers) and formal communication (statements and speeches from community leaders as per their recorded questionnaire responses in Table 14 below.

<i>Which communication tools do you mostly pay attention to?</i>	Strongly agree	Slightly agree	Agree	Neutral	Disagree	Slightly Disagree	Strongly disagree
Informal communication – social media and blogs	41.1%	15.1%	22.6%	5.5%	11.0%	2.1%	2.7%
Mass media communication – the media: TV, Radio & newspapers	41.8%	15.1%	30.1%	8.9%	3.4%	0.7%	0.0%
Formal communication – university Pinboard/e-mails	34.2%	19.2%	33.6%	8.2%	2.1%	2.1%	0.7%

Formal communication – statements & speeches from community leaders	23.3%	19.9%	24.7%	19.2%	8.9%	0.7%	3.4%
Formal communication – organisations websites: WHO, Department of Health, DUT	37.0%	19.9%	20.5%	13.0%	5.5%	2.7%	1.4%

**Table 14 - Questionnaire responses for communication channels that staff and students paid attention to during the COVID-19 pandemic. Source: Authors own illustration (2024)**

As revealed from the in-depth interviews most participants paid attention to DUT’s formal communication channels such as emails and PINBOARD statements. The Table 14 above with questionnaire responses elaborated that indeed most participants paid attention to the DUT’s formal communication channels, such as emails and PINBOARDS statements. The neutral stance from the questionnaire responses recorded in Table 14 elaborates the critique from the interviewee (P11) above the table hence Suppan *et al.* (2022) recommend that institutions must improve the efficacy of their communication so as to re-build the trust of their stakeholders.

To conclude, the formal communication channels at DUT, which were characterised by university emails and PINBOARDS solicited a mixed response from the questionnaire responses. Even though almost over half of the recorded responses acknowledged the efficacy of DUT’s emails and PINBOARDS statements, other few recorded questionnaire responses were neutral.

### 6.2.3. Theme 2: Campus noticeboards and posters

The university campus noticeboards display posters with information related to staff and students. These noticeboards are often used by most universities globally as a communication channel that displays academic information or announcements for staff and students (Ab Halim *et al.* 2011). The downside of traditional noticeboards is the wastage of ink and paper which impacts the environment (Maheshwari *et al.* 2018; Aydemir and Özsoy 2020) hence an Indian study proposed the use of electronic noticeboards controlled by voice commands and can be operated through a smart phone (Sahoo *et al.* 2022). In this modernised world, the disadvantage of only relying on the posters displayed from campus noticeboard is that only few staff and students may notice them. However, to spread the messages of COVID-19 information, DUT used campus noticeboards and posters to create COVID-19 and vaccine awareness. The interviewed participants mentioned seeing campus noticeboards and posters around campus with COVID-19 vaccine related information. The participants recalled:

*“Before we went to lock down the institution communicated via email and with our HOD. In every campus corner and in campus noticeboards there were posters with information related to COVID-19.” (P9)*

The recommendations of a Ghanaian study conducted at Cape Coast Technical University implore academic institutions to enhance the use of traditional or campus noticeboards through the digital noticeboards to deliver emergency messages that requires urgent feedback from students (Sackey, Yandoh and Sangban 2023). This was done by the case university because the campus noticeboards and posters were concurrent with emails and DUT PINBOARDS statements. In the below excerpt, the participant mentioned that:

*“Communique about vaccine was sent to us through PINBOARD statements, emails, campus noticeboards, and posters.” (P12)*

Other participants alluded that the campus noticeboards displayed posters with information related to COVID-19. Furthermore, the participant mentioned that they recalled seeing someone on campus interacting with students and assumed that she was delivering vaccine related information. The participant recollected:

*“We received lot of emails, there were posters at the gate as well. At one point, I think I saw someone who is a nurse interacting with the students. She was using a loudhailer, so you were able to hear her from distance that she was talking about the vaccine, I’m just not sure if she was part of the DUT staff or not.” (P15)*

During lockdown campus access was limited and it is important to stress that campus noticeboards and posters can only be effective if staff and students are permitted to be on campus. In the context of this study, they can only be used by the institution to emphasise information that has been sent through other communication channels such as emails and SMSes.

#### 6.2.4. Theme 3: Workshops and online meetings

The findings revealed that DUT’s COVID-19 RTT hosted a series of workshops to address vaccine hesitancy and provide expert perspectives on the impact of the COVID-19 pandemic. The participants mentioned workshops and online meetings hosted by the institution to discuss COVID-19 vaccination processes among the university community. A participant mentioned that:

*“The university hosted a couple of workshops for people who might have been vaccine hesitant or those just to find out more about COVID-19 from a health experts’ perspective.” (P3)*

The findings of the study that assessed the impact of educational workshops to minimise COVID-19 vaccine hesitancy revealed that health expert led workshops influence students’ vaccination decisions and increases COVID-19 acceptance (Al-Turk, Akour and Farha 2022). In the context of this study, staff and students were invited by the COVID-19 RTT to online

meetings and workshops through emails and PINBOARD statements. The participant recalled that:

*“I remember there was a meeting called by the institution, it was online, but I didn’t attend it because I was already angry that they decided to impose the vaccination mandatory policy on us.” (P14)*

Based on the above comments from the participants, it is unclear whether the institutions’ efforts to create COVID-19 awareness and encourage vaccination through workshops and online meetings was affected by the vaccination mandatory policy that participants claimed it was imposed on them by the institution.

#### 6.2.5. Theme 4: Website and Mobile App

When lockdown restrictions were eased, universities were partially open for contact services and the case university urged their stakeholders to use Higher Health: HealthCheck, a mobile app used to track COVID-19 related symptoms (DUT 2020b) . For this study High Health: HealthCheck is loosely interpreted to “HEALTH APP” by participants. During the interviews, one participant mentioned the mobile app for COVID-19 testing. The participants mentioned that:

*“We received COVID-19 information through emails and PINBOARD. Before the availability of the vaccine, the institution encouraged us to test for COVID-19 and track symptoms using health mobile app. When we arrived at campus, we had to produce our symptoms status from the app before we entered the gate.” (P1)*

A systematic review of mobile apps to monitor and track COVID-19 symptoms concluded that most apps prioritised tracking acute symptoms (Schmeelk *et al.* 2022). They recommended that future apps need to include tracking for long-term COVID-19 symptoms (Schmeelk *et al.* 2022).

The DUT and the DoH websites and the mobile health app was used by staff to access information about COVID-19 and vaccination information in combination with emails and DUT PINBOARD. Others recalled using both the DUT and DoH websites:

*“The institution sent communique using emails and PINBOARD statements. I assume that staff and students were privy to those statements. The information shared by the institution’s website was also available from the Department of Health website because I remember using the website to know more about COVID-19.” (P15)*

These findings correspond with the questionnaire responses in Table 14 (in theme two 6.2.3) endorsing formal communication channels such as websites of organisations like the WHO were considered by most participants. These websites were endorsed because of their credibility, especially the WHO that led the global response to the COVID-19 pandemic.

#### 6.2.6. Theme 5: SMS

One of the communication channels used by DUT to encourage COVID-19 vaccination among the university community was the SMS systems. A participant mentioned receiving SMSes with information on how to book for vaccination. The participant recalled:

*They communicated through emails issuing statements and on their (DUT) social media. There was a time when we received SMSes with information on how to book for vaccination. (P4)*

Even though only one participant mentioned receiving SMSes to book for COVID-19 vaccination, this indicates the efforts made by the case university to encourage vaccination using different communication channels to reach staff and students. Guided by the HBM, the study conducted by Lee *et al.* (2024) assessed the efficacy of text message reminders to enhance COVID-19 vaccination booster on adults. Their findings revealed that SMS reminders are an effective approach to encourage COVID-19 vaccination among elderly people through the HBM concepts (Lee *et al.* 2024). This therefore emphasise that the case university was strategic to use the SMS system to encourage vaccination.

#### 6.2.7. Summary of Objective 1 findings

It is evident that the DUT informed, educated and created awareness about COVID-19 and vaccination among the university community. The communication channels employed by the DUT were varied, with emails and PINBOARD statements being the primary formal communication channel to disseminate COVID-19 information. While this method proved to be effective for most participants, there were challenges with inconsistent or unclear communication, indicating the importance of ensuring consistent and accurate messaging. Utilising multiple communication channels, including emails and PINBOARD statements, workshops, SMS messages and physical displays (posters and campus noticeboards), helped keep staff and students informed about the COVID-19 vaccines. The comprehensive approach taken by the DUT in disseminating COVID-19 vaccine information stands out, encompassing various influences on vaccine hesitancy. This approach promotes well-rounded perspectives and informed decision-making, fostering transparency, inclusivity and awareness.

Moreover, a significant portion of the participants were positively influenced by the DUT's COVID-19 information dissemination. This affirms the university's role in the collective effort to overcome the COVID-19 pandemic challenges by informing, educating and creating awareness for staff and students. The assessment of the DUT's COVID-19 vaccine information dissemination reveals both positive reception and challenges. Transparency, addressing concerns and maintaining flexibility in communication approaches are crucial in

navigating the complex landscape. By fostering trust and facilitating positive behaviour changes, effective communication, especially on social media platforms, contributes significantly to public health awareness and informed decision-making.

### **6.3. OBJECTIVE 2: SOURCES FOR COVID-19 VACCINE AND VACCINATION INFORMATION**

#### 6.3.1. Introduction

The second objective of this study is to explore staff and students' source for COVID-19 vaccine and vaccination information. This objective aims to identify sources used by the participants to search for more COVID-19 related vaccine information and the vaccination information which influences their vaccination decisions. The themes that emerged pertaining to this objective are as follows:

Theme 1	Personal research sources
Theme 2	Government updates and university pinboard

#### 6.3.2. Theme 1: Personal research sources

A study conducted in the United States that assessed COVID-19 information seeking patterns found that participants who had more resources used multiple sources of information to research COVID-19 information (Reisdorf *et al.* 2021). However, their findings were influenced by a variety of factors such as “age, gender, race, income, education, political leaning, and internet skills” in relation to how many sources that participants used to source and verify COVID-19 information (Reisdorf *et al.* 2021: 02). The findings of this study revealed that participants conducted their own personal research through multiple sources of information such as Television (TV) news, radio, social media (especially Twitter), health professionals' videos, consultation with health professionals and academic articles to source COVID-19 vaccine information and vaccination information. The participants recalled using multiple sources below:

*“From DUT, the news on TV and radio, and social media, especially Twitter. There were health professionals who were recording videos and posting them on social media. It was great that they could share what happens in hospital and address myth linked to the COVID-19 and vaccination.” (P1)*

*“I’m a consumer of news, when we were in lockdown, I would watch probably 12 hours of news on TV. I would switch between different channels.” (P3)*

*“I read around, watched interviews, and listened to different perspectives and positions on the vaccination. I relied on several sources to come to a personal decision. I used YouTube videos,*

*scholarly articles as well as newspapers to know more about the vaccine.” (P5)*

*“I watched the TV news and listened to radio because they had information readily available.” (P6)*

*“Over and above the information sent by DUT COVID-19 Response Task Team, I watched the news on TV and listened to radio.” (P7)*

*“There were lot of fake news and misinformation I decided to only use TV to watch news about COVID-19 and vaccines.” (P9)*

*“By watching the news and reading articles online.” (P13)*

According to Wang *et al.* (2021) people use different media channels to discover more about health information. During the interviews, one participant recalled watching news channels that allowed health experts sufficient airtime to discuss facts about the available vaccines. Furthermore, the participant narrated:

*“When watching the news on TV, I made sure that I watched the news channel that was impartial and allowed the invited health experts enough airtime to discuss fact about the available vaccines.” (P15)*

Impartiality and accuracy are critical aspects in mass media which establishes trust between the consumers of news and the media. According to Xu *et al.* (2022) the media should be impartial and be obligated to debunk misinformation. In the context of this study, it will be easier for participants to trust several news channels if they are impartial and this will influence their vaccination decisions. These findings correspond with questionnaire responses in Table 15 below where most participants indicated that they sourced COVID-19 vaccines and vaccination information on TV, radio and newspapers.

<i>Where did you source information about COVID-19 vaccine and vaccination?</i>	<b>Strongly agree</b>	<b>Slightly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Slightly Disagree</b>	<b>Strongly disagree</b>
The media – TV, radio and newspaper	64.4%	11.0%	18.5%	2.1%	3.4%	0.0%	0.7%
Social media – Facebook, Twitter, Tiktok, Instagram, WhatsApp	52.7%	10.3%	17.1%	4.8%	8.2%	1.4%	5.5%
Influential people – celebrities, community leaders, religious leaders	23.3%	10.3%	19.9%	21.9%	13.7%	2.7%	8.2%
Family members, friends, colleagues	32.2%	16.4%	26.0%	11.0%	6.8%	2.7%	4.8%

University Pinboard – website, statements and emails	39.0%	19.2%	21.2%	13.0%	2.7%	2.7%	2.1%
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**Table 15 - Questionnaire responses indicating multiple sources for COVID-19 vaccine information and vaccination information used by participants. Source: Authors own illustration (2024)**

As per the above Table 15, more than half of the participants explored social media platforms such as Facebook, Twitter, TikTok, Instagram and WhatsApp for COVID-19 vaccine and vaccination information. According to Cuello-Garcia, Pérez-Gaxiola and van Amelsvoort (2020); and Basch *et al.* (2021) misinformation and fake news are a cause for concern on social media and can result in dire consequences. However, if social media is used responsibly, it can be a useful communication channel that can be used for interaction between medical experts and patients (Ferreira and Borges 2020). As such, during a health crisis it is crucial for health policy makers to unpack the role of social media platforms and their influence on an individuals’ decision (Cuello-Garcia, Pérez-Gaxiola and van Amelsvoort 2020).

Nevertheless, some individuals relied on consultations with influential people such as health experts who are doctors, pharmacists, nurses and colleagues who were in the medical industry for trustworthy information because they trusted them. The participants narrated how they sourced COVID-19 vaccine and vaccination information below:

*“I relied on the Doctor that I consulted with.” (P4)*

*“I had a friend who is pharmacist that I consulted with. There was a lot of information out there which was confusing, so I turned to people that were in medical industry, people that I could trust.” (P11)*

One participant holds highly the opinions of their colleagues and influential people such as nurses and doctors. The participant said that:

*“We had discussion with my colleagues. At church we have Doctors and nurses who were able to guide us and tell us more information about vaccination.” (P14)*

Same as the interview’s findings, the questionnaire responses in Table 15 above elaborated that family members, friends, colleagues, influential people such as community leaders, religious leaders and celebrities were their sources of COVID-19 vaccine and vaccination information. The survey findings are affirmed by the findings of the study conducted in America about the possibility of vaccinating based on being influenced by a celebrity and targeted messages to minimise COVID-19 vaccine hesitancy (Reddinger, Levine and Charness 2022).

Some participants conducted their own research, reading scholarly articles to learn more about the COVID-19 vaccines and vaccination. This allowed the participants to make informed decisions. The participants narrated:

*“I spoke with colleagues and read academic articles.” (P8)*

*“I’m a researcher, I like to read other scholars work and critics work so I accessed lots of academic articles in a medical field.” (P15)*

Other participants did not solely rely on academic articles, but they explored the internet at their own discretion and explored social media. The participant said:

*“I did my own research on internet and social media.” (P2)*

The internet is an important source of health information which impacts its users positively or negatively depending on the quality of information accessed (Cuan-Baltazar *et al.* 2020; and Hernández-García and Giménez-Júlvez 2020). The public and health professionals need to be aware that the use of internet has an impact on public health especially during the health crisis. Therefore, Cuan-Baltazar *et al.* (2020) recommended that government should develop and implement strategies to regulate health information produced and posted on the internet.

### 6.3.3. Theme 2: Government updates and University Pinboard

Very few interviewees relied on government updates, including tweets from the South African Minister of Health and the DoH websites to stay informed about the COVID-19 vaccine and vaccination. The participants recited:

*“Health department and South African government, particularly was very effective in ensuring that we as citizens received information about vaccines, from watching the news on TV to listening to radio, etc.” (P10)*

*“I relied on the Department of Health website, tweets by our Minister of Health in terms of giving us updates, he made sure that daily there was a post regarding the state of COVID-19. How many infections we have accumulated and how many deaths have occurred in the past 24 hours, so that is the information that I relied on daily. However, I also used the Department of Health websites to learn about the vaccine in general. At that time, I had an opportunity to write something on a COVID-19 and that required me to research and read information that was published at that time.” (P12)*

Organisational communication is a strategy that aims to develop and implement effective communication between the organisation and their stakeholders internally and externally (Hume and Leonard 2014; Ali *et al.* 2021). It is noticeable that the South African government communications through the DoH efforts were appreciated by the interviewed participants hence they sourced their COVID-19 vaccine and vaccination information. Furthermore, the questionnaire responses in Table 15 indicates that the participant relied on their organisation’s

(institution) communication where they sourced COVID-19 vaccine and vaccination information through the university Pinboard. This means that the DoH and the DUT were trusted organisations to source COVID-19 vaccine and vaccination information that influenced the participants' vaccine decision.

#### 6.3.4. Summary of Objective 2 findings

The participants obtained information about COVID-19 vaccines from various sources, indicating their proactive approach to staying informed. Additionally, some individuals emphasised the importance of staying informed through impartial news channels that provided expert perspectives. Exploring sources from which staff and students sourced COVID-19 and vaccination information emphasises the importance of a comprehensive approach. Traditional and social media, influential figures, personal connections and university communication channels collectively shape the information landscape. This diverse array of sources necessitates a multifaceted strategy to disseminate accurate information, effectively countering misinformation during a global health crisis.

### **6.4. OBJECTIVE 3: VERIFICATION OF COVID-19 VACCINE AND VACCINATION INFORMATION**

#### 6.4.1. Introduction

The third objective of this study is to explore the process used by staff and students to verify COVID-19 vaccine and vaccination information. This objective aims to explore the verification process used by the participants to verify the COVID-19 vaccine and vaccination information that they received and sourced which influenced their vaccination decisions. Furthermore, this objective probe whether the participants verified COVID-19 vaccine information that they received from the COVID-19 RTT of the case university. The themes that emerged pertaining to this objective are as follows:

Theme 1	No verification needed
Theme 2	External sources verification

The staff and students are perceived as literate beings who fact check and are familiar with strategies of verifying information sent to them. The discussed findings in 6.3 established that staff and students used multiple sources to gather more information about COVID-19 and vaccination. Therefore, the assumption would be staff and students followed a verification process that they used to verify COVID-19 vaccine information disseminated by DUT's COVID-19 RTT to them.

#### 6.4.2. Theme 1: No verification needed

COVID-19 was rumoured to be pneumonia in 2020 and this increased the significance of using a verification process to debunk misinformation and fake news during the COVID-19 health crisis (Aguado-Guadalupe and Bernaola-Serrano 2020; Ceron, de-Lima-Santos and Quiles 2021). However, the findings of this study revealed that some participants did not feel the need to verify the COVID-19 information from DUT because they believed it was sourced from reliable organisations such as the WHO and the DoH nationally. They emphasised that:

*“There was no need to verify, as the institution conveyed messages from the WHO as well as our National Health Department. DUT COVID-19 RESPONSE TASK TEAM was very consistent with providing us with information about vaccines, I think I liked that there were very consistent. When you use the DUT website, there was special section allocated for COVID-19 related information. The information about colleagues who died I think it was posted every Friday.” (P1)*

*“I saw that information after I got vaccinated, even if I received the information before vaccination, I don’t think that the institution would send us information that would put our lives at risk.” (P9)*

*“I trusted our university; I didn’t verify it.” (P12)*

*I did not verify it. (P13)*

*“I don’t think I did because they sent us the same information sent by the Department of Health, it just that the Department of Health was more proactive with publishing information.” (P15)*

These findings confirm trust that the participants have placed on their institution in terms of issues that related to their well-being. As a result, staff and students can accept vaccination and adhere to the COVID-19 protocols.

#### 6.4.3. Theme 2: External sources verification

During the interviews, a participant claimed that the institution did not thoroughly inform them because they received information late. To bridge the information gap, they used external sources to verify COVID-19 vaccine and vaccination information sent by the institution. The participants alleged that:

*“When I spotted the gap from the information sent by the institution, I consulted with my doctor to verify it. Some information was sent by the institution very late.” (P4)*

To bridge the knowledge, a Chinese study conducted by Zhou *et al.* (2022: 01) recommended “improvement in the timely dissemination of information”. Their research findings were gathered from the disadvantaged people; however, they are related to the above comment made by the participant (P4). Furthermore, other participants recounted their disappointment

with the case university which propelled them to use external sources to verify information.

The participant claimed that:

*“I relied more on outside sources because the institution was sending us a repetitive information.” (P2)*

*“I didn’t much pay attention to the information sent by DUT, but I verified the myth posted on social media with my friend who is a pharmacist.” (P11)*

Therefore, the participant recommended that:

*“The institution should have used published health or medical articles and capitalise on scholarly articles to convey the information.” (P4)*

Even though the findings revealed that the interviewed participants did not fully trust or appreciate the case university’s communication efforts regarding the COVID-19 vaccine and vaccination information, the questionnaire responses recorded in Table 16 below collaborate these findings. The university’s official communication via website, statements and emails ranked third as a source to be used to verify the vaccine information sourced by staff and students.

<i>How did you verify vaccine information that you have received or sourced?</i>	Strongly agree	Slightly agree	Agree	Neutral	Disagree	Slightly Disagree	Strongly disagree
Compare it with official statements from the community leaders	24.0%	13.7%	24.0%	17.1%	12.3%	1.4%	7.5%
Compare it with mass media communication – the media: TV, Radio and newspapers	42.5%	20.5%	20.5%	6.2%	5.5%	1.4%	3.4%
Compare it with university official communication via website, statements and emails	28.1%	21.2%	28.1%	11.6%	4.8%	1.4%	4.8%
Compare it with the information released by the World Health Organisation official statements	45.9%	19.2%	21.2%	6.8%	2.7%	1.4%	2.7%

**Table 16 - Questionnaire responses indicating sources that staff and students used to verify COVID-19 vaccine information that they received and sourced. Source: Authors own illustration (2024)**

The above findings in Table 16 suggest that the university need to make efforts in strengthening the credibility of their information for their population to be trusted as a source that can be used to verify information sourced by staff and students. Moreover, through questionnaire responses in Table 16 above the WHO statements emerged as the most used source to verify COVID-19 vaccine and vaccination information sourced by staff and students. The case university can adopt communication strategies implemented by the WHO as they have global credibility and reputation in issues related to public health crisis, such as COVID-19.

Through questionnaire responses in Table 16 above, the mass media communication which involves TV, radio and newspapers occurred as the second most used external source that participants used to verify COVID-19 vaccine and vaccination information that they received and sourced. The questionnaire responses expanded on the findings from the interviews where participants explored various news channels as their verification strategy. One participant narrated their verification strategy:

*“The way that I verified the news was if similar or different experts said the same thing on different news channels, I would believe that information as fact. I switched between different channels and in those channels, there were different doctors, professors, eminent individuals in their profession who were telling us, information about health.” (P3)*

According to Toff *et al.* (2020) in the media there are challenges that affect the supply of news to meet the information demand of the public and as such trust in news is low hence other participants claimed that the broadcasted COVID-19 related news on TV and radio were repetitive and subjective and as a result, they did not see the importance or the need of verification:

*“I didn’t verify the information, instead I decided to switch off the TV and radio as there was a repetitive information from one angle advocating for vaccination.” (P6)*

Even though other participants did not trust broadcast news on TV, some increased their TV screentime to consume more news to be more informed and not necessarily verifying the information that they sourced or received from the institution. The participant indicated that:

*“I didn’t, but I watched more news than I usually do because I wanted to know more about vaccines, and I wanted to keep myself updated and informed. I didn’t see a reason to verify the institutional communication because why would the institution convey fake information.” (P7)*

Furthermore, it's impressive to note that the participants did not rely only on one source to verify information, but they used multiple sources such as health experts' opinion, Google, scholarly articles and medical professionals to cross-verify information sent by DUT.

*“Not relying on one source was a way of verifying and supporting my own view on the issue of a vaccine and the vaccination.” (P5)*

*“I used Google to verify information and talking to people, even though they were not health experts, but I wanted to make sure that I have the same information as them because some of them vaccinated before me.” (P8)*

*“I verified it with doctors and nurses that I go to church with. They didn't mind, as a result, after church it was standard that we will have a mini gathering talking about COVID-19.” (P14)*

As per questionnaire responses recorded in Table 16 above, this study gathered that the participants valued diverse opinions hence staff and students opted to use community leaders' statements as a source to verify the COVID-19 vaccine and vaccination information. These findings correspond with the findings from interviews where participants consulted with their community members and professional institutions that they are affiliated with. One participant narrated that:

*“By discussing and sharing our facts with a group of people in our community. There's also a professional body that I am affiliated to, we shared and discussed what we know about the vaccine. It was a great platform to sort of fact check if what you know is indeed accurate.” (P10)*

Several participants mentioned that they used external sources, such as the mass media communication, community leaders' statements and the WHO statements to verify their sourced COVID-19 vaccine and vaccination information. Moreover, the participants used the university's official communication channels to verify the COVID-19 vaccine information sourced from external sources.

#### 6.4.4. Summary of Objective 3 findings

The verification process was more intentional for few participants, but others could not be bothered. The cross-verifying of the COVID-19 vaccine and vaccination information from multiple external sources was common among the participants. This highlights the importance of providing accurate and transparent information, dispelling myths and addressing concerns to build trust among the university community. Trust, credibility and communication channels are intricately linked in COVID-19 vaccine and vaccination information verification. The diverse range of sources demands transparent and credible communication strategies to empower individuals in making informed health decisions. The complexity of vaccine decision-making underscores the importance of clear communication, addressing concerns and bridging

understanding gaps. This calls for adaptable public health communication strategies that cater to the diverse factors influencing individual choices.

## 6.5. OBJECTIVE 4: FACTORS INFLUENCING COVID-19 VACCINATION DECISION-MAKING

### 6.5.1. Introduction

The fourth objective of the study is to determine COVID-19 vaccine and vaccination information that influences staff and students' vaccination decision-making. This objective aims to investigate factors that influences staff and students' vaccination decisions by identifying the type of COVID-19 vaccine information that is more likely to influence participants vaccine decisions. Furthermore, this objective assesses whether the communication tools used to disseminate the DUT's COVID-19 vaccine information influenced the participants' vaccination decisions. Lastly, this objective seeks information that the participants wished the COVID-19 RTT shared about vaccination. In the past, factors influencing vaccination decision-making have been researched and focused on pandemic influenza N1H1, human papillomavirus vaccine, etc (Ashbaugh *et al.* 2013; Sisson and Wilkinson 2019). This study probed the factors influencing COVID-19 vaccine decision-making for staff and students. Themes that emerged pertaining to this objective are as follows:

Theme 1	Uncertainty and perceived risks
Theme 2	Mandatory policy and lack of choice
Theme 3	Trust in official health communication
Theme 4	Comparison with traditional medicine

### 6.5.2. Theme 1: Uncertainty and Perceived risks

Uncertainty and hesitancy were observed due to changing COVID-19 information, concerns about vaccine-related deaths and conflicting reports on different vaccine types. The participants narrated that:

*“The information about the vaccine was always changing and I couldn’t keep up.” (P4)*

*“There were questions that were not properly addressed like the deaths associated with vaccination hence the hesitancy on my behalf.” (P5)*

*“There were lot of reports about the negative elements of each of the COVID-19 vaccines. At some point, there were reports about people who vaccinated and reacted badly to both types of vaccines that were available at that time. I got confused and even more hesitant to vaccinate.” (P7)*

Uncertainty and perceived risks imply that participants were often in stage three called preparation of TTM, yet they struggled to progress to stage four called action because the perceived risks were confirmed by the inconsistent COVID-19 vaccine information. The lack of clarity on the effects of vaccines such as death, bad reaction and contradictory vaccine reports impacts vaccination decisions. This could be as a result of ineffective COVID-19 vaccine communication hence the participants emphasised the importance of debunking misinformation and conspiracy theories circulating on social media to build trust in vaccination. The participants urged that:

*“I think they also need to be able to address what’s going around social media as well and prove that some of the COVID-19 information posted it is not correct.” (P2)*

*“There were so many COVID-19 conspiracy theories circulated on social media, I wish our institution focused on clarifying them and cautioned us about misinformation.” (P15)*

This means that the institution’s COVID-19 RTT neglected communication strategies that included the aspects of addressing misinformation. Moreover, some participants wished that the DUT’s COVID-19 RTT shared COVID-19 vaccine information tailored to people with chronic illnesses or specific health conditions. The participants alluded that:

*“It would have been great for the institution to share information on how the vaccine affects people who have chronic illness, and how will they react after vaccinating. I don’t recall reading any statement about it. Also talk about the effectiveness of vaccine especially for people with chronic illnesses.” (P9)*

*“There were rumours about the vaccine not working for people who have diabetes and HIV. The institution did not say anything about it in their statements.” (P13)*

The results of the systematic review conducted by Cooper *et al.* (2020: 567) were “more data are needed to determine COVID-19 outcomes in patients with AIDS”. They recommended research that investigate the impacts of HIV infection on COVID-19 (Cooper *et al.* 2020). This highlights a gap in the literature with regards to whether HIV/AIDS and COVID-19 impacts vaccination decision-making because people living with HIV are uninformed of the effects of the vaccine hence the rumours narrated by participant (P13) above may instil fear and contribute to vaccine hesitancy among people living with HIV.

To encourage COVID-19 vaccination, Cohen *et al.* (2020); and Rzymiski *et al.* (2021) recommended clear information on perceived COVID-19 risks and benefits as a strategy to increase vaccine acceptance. The findings revealed that the information about side effects and safety, including research from credible sources like Harvard Online played a role in

influencing some participants' vaccination choice against COVID-19. The participant highlighted that:

*"I read the articles on Harvard Online and their reviews about the side effects of the COVID-19 vaccines. Their website was a solid base for me because they balanced the pros and the cons. According to the reviews, the vaccination risks was very tiny." (P2)*

It is important to note that other participants were informed about vaccine side effects, however, their vaccination decisions were not influenced by it. A participant affirmed that:

*"The side effects did not influence my decision to vaccinate." (P3)*

Furthermore, other participants only desired to protect oneself and family members from COVID-19 was a significant factor influencing vaccination decisions. The participants expressed that:

*"The most important this was to protect myself against COVID-19. I didn't stress myself with information related to side effects even though when I took it, they said I might feel dizzy and numb for some time, but I was not worried." (P1)*

These findings are affirmed by studies that assessed motivation and barriers to vaccinate with COVID-19 where extrinsic motivations (protection of family friends and community) were reported to influence vaccination decisions (Shelus *et al.* 2020; Yang *et al.* 2020; Moore *et al.* 2022). Furthermore, the participants of this study revealed that they desired to receive a balanced presentation of the benefits and risks of vaccination to make informed vaccination decisions. The participants asserted that:

*"Pros and cons of vaccinating." (P4)*

*"There was no clear information that addressed the risks of the COVID-19 vaccines, that made me a bit hesitant." (P3)*

According to Yang *et al.* (2020) the desire to protect other people and self-perceived risks were mostly related to prevention measures and adherence to COVID-19 protocols rather than vaccination decisions. Therefore, addressing concerns related to potential adverse effects and risks is crucial in dispelling misinformation and ensuring staff and students are equipped with accurate COVID-19 vaccine information hence the participant opted to:

*"I researched about the side effects so that I can know in advance what will happen to my body after vaccination." (P8)*

The participants wanted COVID-19 vaccine information that would ease their fears about vaccinating and provide transparency regarding potential side effects and complications. They claimed that:

*"I think vaccinating was not warranting that I won't contract the disease. I wish the COVID-19 Response Task Team shared any information that*

*would ease our fears and reassure us that we will survive the virus and how to survive it.” (P10)*

*They didn't tell us that people might react differently to the vaccines, they didn't talk much about the complications after vaccination and most people who were sharing their stories and bad experience with the vaccination were dismissed. I wish they were upfront about the side effects.” (P11)*

Some participants expressed an interest in knowing more about vaccine effectiveness against new variants and any potential long-term effects. The participant indicated that:

*“I was unsure whether after vaccinating I will be protected against the new variants. And I was scared that maybe I might suffer long-term side effects after vaccinating.” (P7)*

This finding implies that uncertainty resulted in fear of the unknown as the participant had no knowledge about the long-term side effects. This finding relates to the existing concerns of vaccine safety. Vaccine safety concerns were among the significant factors cited in a study conducted in sub-Saharan Africa that probed the acceptance of COVID-19 vaccines (Kanyanda *et al.* 2021). Consequently, Hayawi *et al.* (2021) systematically reviewed vaccine efficacy against three variants and revealed that fully vaccinated individuals were protected against the Alpha B.1.1.7 variant, protection against Beta (B.1.351) variant had inconclusive results and the results indicated that fully vaccinated individuals received lower protection against the Gamma (P.1) variant.

During interviews, the participants expressed their desire for more information about how the COVID-19 vaccines work in their bodies, what to expect after vaccination and the safety of the vaccine. They asserted that:

*“Information about how our bodies work when you have taken the vaccine.” (P1)*

*“How safe is the vaccine and vaccine benefits.” (P9)*

These findings are affirmed by the questionnaire responses recorded in Table 17 below where it emerged that possible long-term COVID-19 vaccine side effects influenced vaccine decisions. The questionnaire recorded responses also emphasised that perceived risks of vaccines influenced vaccination decisions. Therefore, it is crucial for the institution to provide assurance through their COVID-19 vaccine communication with information that addresses concerns about harmful outcomes after vaccination.

<i>Which vaccine information that is more likely to influence your decision about COVID-19 vaccine and vaccination?</i>	Strongly agree	Slightly agree	Agree	Neutral	Disagree	Slightly disagree	Strongly disagree
Perceived benefits of the vaccine	37.7%	13.0%	24.0%	11.0%	4.8%	2.7%	6.8%
Mode of administration	20.5%	14.4%	29.5%	16.4%	10.3%	3.4%	5.5%
Effectiveness of the vaccine	38.4%	13.0%	23.3%	11.0%	7.5%	2.1%	4.8%
Availability of the vaccine	23.3%	11.0%	30.1%	15.1%	11.0%	3.4%	6.2%
Regulatory information	28.1%	15.1%	27.4%	17.8%	5.5%	2.1%	4.1%
Perceived risks of the vaccine	40.4%	16.4%	25.3%	6.8%	4.8%	1.4%	4.8%
Possible long-term side effects	45.9%	15.1%	21.2%	9.6%	3.4%	1.4%	3.4%

**Table 17 - Questionnaire responses indicating type of COVID-19 vaccine information that is more likely to influence participants vaccination decisions. Source: Authors own illustration (2024)**

Even though other few participants searched COVID-19 vaccines available for them or to them as indicated in Table 17 above, the findings gathered from the interviewed participants indicate that the participants prioritised their safety by searching for information related to vaccines side effects. A participant stated that:

*“I researched information about the type of COVID-19 vaccines available, where it comes from, but mostly the side effects of the vaccines.” (P12)*

This finding further highlights the importance of vaccine accessibility and efficient vaccine distribution in all communities, irrespective of being rural or urban areas or private higher learning institutions or public higher learning institutions (Ruiz *et al.* 2023). Furthermore, in the questionnaire responses presented in Table 17 above, this study gathered that the regulatory vaccines information somehow influences vaccine decisions. This highlights the importance of transparent communication from regulatory bodies to foster public confidence.

Furthermore, the interviewed participants’ desired information (wished to be informed) about the different available COVID-19 vaccines and their respective benefits. They claimed that:

*“I don’t remember reading something about the benefits of each vaccine, because till today I don’t know which one is the best.” (P7)*

*“I did not like how the institution instilled fear on us by constantly sharing statistics of how many people who have died instead of informing us about the pros and cons of vaccines available and clarify why was there a need for two types of vaccines instead of one.” (P8)*

It emerged in the questionnaire responses presented in Table 17 above that the perceived COVID-19 vaccine benefits influences staff and students’ vaccine decisions. These findings are affirmed by the results of the study conducted in the US which indicated that the anticipated benefits mostly influenced respondents vaccination decisions compared to projected side effects (Kaplan and Milstein 2021). The findings discussed in this theme underscores the profound role that the perception of positive vaccination outcomes holds in influencing decisions such as vaccinating. Furthermore, addressing concerns related to the COVID-19 vaccine mode of administration could potentially ease uncertainties and reinforce confidence in the vaccination process for staff and students.

### 6.5.3. Theme 2: Mandatory Policy and the lack of Choice

Debates, critics and views on COVID-19 mandatory vaccination have been globally documented (Franco 2021; Gostin, Salmon and Larson 2021; Gur-Arie, Jamrozik and Kingori 2021b; Cheng 2022). As discussed in the literature, the DUT adopted and implemented a policy named the ‘Three-Choices Vaccination Policy’ that applied to the university community (DUT 2021c). Furthermore, data were collected in year 2023 during semester one whilst the vaccination policy was still a burning issue among staff and students. In the discussion of the findings of this study, the participants loosely interpreted Three-Choices Vaccination Policy to “*mandatory policy*”. Even this policy was later suspended after the DUT Council announced the resumption of contact classes in July 2022. It is important to note that this study began when the policy was still fully implemented. In February 2022, the DUT partially permitted staff and students to visit campuses but were expected to follow the mandatory requirements to be granted campus access. These mandatory requirements were that staff and students needed to show security personnel at the campus entrances a vaccination certificate or a less than seven days negative PCR test result, valid staff or student card and a green Higher Health: HealthCheck result as stipulated in the approved Three-Choices Vaccination Policy (DUT 2020b).

The mandatory vaccination policy imposed by the institution influenced some participants vaccination decisions. The participants claimed that:

*“The vaccination mandatory policy imposed by our institution influenced by my decision to take the vaccine.” (P8)*

*“I only vaccinated because of the vaccination mandatory policy that the institution imposed on us.” (P5)*

These findings are affirmed by Sprengholz, Betsch and Böhm (2021); and Peters (2022) who asserted that imposing the COVID-19 vaccination negatively impacts vaccination decisions and result in increased vaccine hesitancy. Even though other participants factor COVID-19 vaccines benefits, they claimed that their vaccination decisions were influenced by the imposed mandatory policy. A participant asserted:

*“When we had discussions with my colleagues I was impressed about the benefits, but then it is not the benefits that made me want to vaccinate it the policy of the institution.” (P14)*

Furthermore, other participants expressed negative feelings about vaccination being imposed on staff and students, which influenced their decisions. A participant claimed:

*“We were already forced to vaccinate, so whatever that was communicated after the mandatory vaccination policy was not important.” (P8)*

Some participants felt that their vaccination decisions were limited due to the vaccination policy imposed by the institution. As such, they felt they had no choice but vaccinate even though they were hesitant. A participant recounted:

*“I feared vaccinating because of the information that was posted on social media, but I had no choice.” (P4)*

The fear of losing their job due to vaccination requirements influenced some participants to be vaccinated. At some point, one participant thought that the university will dismiss unvaccinated staff. The participant claimed that:

*“I only took a decision to vaccinate because we needed to comply with the vaccination mandatory policy. People from outside DUT were already losing their jobs because they refused vaccination, I didn't want to be part of the statistics.” (P13)*

Alluding to job security, the participant affirmed that:

*“When I read emails about vaccinating, I felt like I was not given a choice to decide about my life. I feared that if I don't vaccinate, I will lose my job.” (P10)*

Furthermore, the need for travel was one of the motivators for vaccination for some participants. The participant indicated that:

*“I was interested to know the about recovery after vaccination because I wanted to travel. During COVID-19, it was compulsory to vaccinate when you were travelling.” (P11)*

This finding indicates that the lack of choice was aligned with personal reasons such as travelling. Other participants mentioned that the DUT's communique about compulsory vaccination for accessing campus and job security had an influence on their vaccination decisions. The participants stressed that:

*“Hence most staff and students vaccinated because they wanted to access campus to utilize the facilities for their academic activities.” (P4)*

*“I remember there was a statement posted on PINBOARD that said if you are not vaccinated you will not be able to access campus. And most of us needed to be at the office to perform our duties, so we vaccinated.” (P12)*

These findings indicates that the lack of choice was aligned with professional reasons such as job security. Therefore, the lack of clarify in terms of job security impacted vaccination decisions of the participants. Some participants acknowledged the importance of institutions adhering to government policies but also wished for consideration of staff and students' beliefs before introducing mandatory vaccination. The participants' urged that:

*“I don't think that the institution had any liberty to come up with their own COVID-19 messages as they had to adhere to the directive from government and they bounded by government regulations. But the institution should have considered staff and students beliefs before introducing the mandatory policy.” (P5)*

The above statement is affirmed by the findings of a study conducted by Mugari and Obioha (2021) which revealed that cultural and religious beliefs do not advocate for vaccination. The literature indicates that cultural and religious beliefs are some of the main factors influencing COVID-19 vaccine hesitancy (Mugari and Obioha 2021; Thinane 2022). The findings discussed in this theme highlights the impact of the lack of choice, selective communication and neglected beliefs of staff and students. As such, beliefs and COVID-19 mandatory policy implications impacts staff and students' vaccination decisions. As such, most staff sacrificed their beliefs and solely vaccinated because of job security and the desire to travel.

#### 6.5.4. Theme 3: Trust in official health communication

The DUT's COVID-19 RTT disseminated COVID-19 vaccine communication through the university's official communication channels for staff and students. While some participants acknowledged some influence from the DUT's COVID-19 vaccine communication, others indicated that it did not heavily impact their vaccination decisions. The participants narrated that:

*“I didn’t need much convincing since I already made a choice to vaccinate.” (P1)*

*“I didn’t need influencing because I knew how important it is to vaccinate.” (P2)*

*“We were bombarded by emails, and I ended up not paying much attention to them. As a result, I wouldn’t say how they communicated or conveyed information about vaccine influenced my decision to vaccinate.” (P6)*

Conveying COVID-19 vaccine communication that staff and students were privy to through other sources painted the institution in a negative manner. The participants stressed that:

*“The information from emails might have influenced others, but not me because it was sent to us late.” (P5)*

*“Our institution sent us information that was already out there, and I did not rely on it most of the times. (10)*

Some participants stated that they already decided to vaccinate independently of the DUT’s COVID-19 vaccine communication. The participants stated that:

*“My decision to vaccinate had nothing to do with DUT.” (P11)*

*“At that time, authorities said there was no cure, I willingly decided to vaccinate not because of what was communicated by DUT.” (P4)*

The regular reminders of active COVID-19 cases and deaths among staff and students played a role in influencing vaccination decisions. The participant affirmed that:

*“You would have been a stone if you were not influenced to decide, because we were reminded weekly when they sent us updates of active cases and staff and students who died because of COVID-19.” (P15)*

However, the participants wished for clear COVID-19 vaccine communication to dispel myths, rumours and cultural beliefs surrounding the vaccine. The participants urged:

*“I wish the government shared that the vaccine doesn’t make you impure, there was a myth or a rumour that the vaccine changes you. The Department of Health did not work much into addressing myths and rumours, I wish they could have clarified them.” (P15)*

*“Our cultural beliefs were not taken into consideration and vaccination clashed with my values.” (P13)*

These findings means that social norms and cultural beliefs impacts COVID-19 vaccination decisions. Furthermore, trust in information from government and health authorities about the

vaccine's safety and efficacy influenced decisions for some participants. The participants recalled:

*“When the health authorities said the vaccine was safe because it has been tested, I trusted them, and I vaccinated.” (P9)*

*“It's the information that we were receiving from the government, but also information on the virus itself. To try and understand the virus and how we can protect ourselves from it. Then I realised that there is no cure, so to protect ourselves from this is to vaccinate. Moreover, the statistics of people who have been vaccinated from other countries and how most people reacted to it influenced my decision.” (P15)*

These findings are supported by Sallam (2021) who urged health authorities and government to increase trust by improving communication. Furthermore, the participants mentioned that hearing from health experts and being assured about the COVID-19 vaccines safety could influence their decisions, especially if they were initially hesitant. A participant stated that:

*“It's very rare that individuals may disputes health expert's views. If health experts explain that there were vaccine trials or test and vaccines are safe to take, you might as well trust what the health experts say and change your mind especially if you were hesitant.” (P3)*

External sources such as the DoH, the WHO and TV news were cited as having influenced vaccination decisions:

*“I vaccinated because I was influenced by the statistics and data shared by Department of Health and the World Health Organisation. As time went by, I learned more about COVID-19 vaccines by watching TV news.” (P9)*

This emphasise the importance of information uniformity for COVID-19 vaccine in all communication platforms as some participants did not only rely on one source to be informed about vaccines. In the context of this study, the COVID-19 vaccine information uniformity impacts vaccination decisions of staff and students. Besides trusting the COVID-19 vaccine information from the DoH, the WHO and TV news, participants trusted traditional medicine and intended to use it to protect themselves from COVID-19.

#### 6.5.5. Theme 4: Comparison with traditional medicine

With no approved medicine as a cure for COVID-19 many people opted to explore traditional medicine, dietary therapy and herbal medicine (Nugraha *et al.* 2020; Panyod, Ho and Sheen 2020; Umata Chali *et al.* 2021; Mutombo *et al.* 2023). In the context of this study, the participants considered traditional medicine as an alternative before the mandatory policy was imposed. A participant claimed that:

*“I stopped researching more about COVID-19 vaccination when the institution told us that vaccinating was mandatory. There was no clarity on why the government was so against traditional medicine and why as African countries we were not prioritised when the vaccine was available and deemed safe after trials. (P6)*

*“I intended to use traditional medication before the institution said vaccine is mandatory.” (P12)*

The above participants claims can be defined as individuals' perceptions as per HBM which are perceived susceptibility and perceived severity. Participants' susceptibility was informed by the availability of alternative traditional medicine to COVID-19. Participants had their own theories on how to protect themselves against COVID-19, hence their perceived severity.

The literature indicates that there has been challenges with policies to successfully legalize the use of traditional medicine or herbal medicine to combat COVID-19 (Xiong *et al.* 2021). However, other participants wished they were provided an alternative mechanism to combat COVID-19 such a traditional medicine: A participant stated that:

*“I wish we were given a substitute like traditional medicine.” (P13)*

A study conducted in Tanzania explored the use of medical plants to combat COVID-19 concluded that “the medicinal plants and phytochemicals revealed to have significant role due to their substantial antiviral activity against SARS-CoV-2 and other coronaviruses” (Mlozi 2022: 1). An Indian traditional medicine was proposed by Vellingiri *et al.* (2020) as a therapeutic cure for COVID-19. Furthermore, one participant claimed that the institution took their right to choose traditional medicine to protect themselves from COVID-19. The participant alleged that:

*“I compared the differences of the two vaccines that were available with traditional medicine. I even tried to explore some traditional medicine to prevent myself from contracting the virus. I was not going to vaccinate; I was going to use the traditional medicine, but the institution thought otherwise, and they took away my freedom to make a choice.” (P10)*

Nevertheless, a study conducted in South Africa revealed that some participants relied on natural remedies such as African Wormwood known as *umhlonyane* in isiZulu and other homemade remedies to strengthen their immune system and limit the chances of contracting COVID-19 (Paredes Ruvalcaba *et al.* 2023). According to Mutombo *et al.* (2023) there is a lack of research and poorly documented results related to the effectiveness of traditional medicine to combat COVID-19. In the case of this study, the participants trusted traditional medicine hence their intention to use it as a substitute than taking COVID-19 vaccines.

#### 6.5.6. Summary of Objective 4 findings

The desire to protect oneself and family members from COVID-19 was the most significant factor influencing vaccination decisions, indicating that personal health and well-being remain key motivators. The respect for individual beliefs and choices, as well as fostering open discussions emerged as important considerations in encouraging vaccination acceptance. The vaccination choices were influenced by a combination of personal beliefs, external information sources and the response programmes implemented by the DUT's COVID-19 RTT. The mandatory vaccination policy and information provided by the institution also played a role in influencing staff and students' vaccination choices. Recognising the diverse range of influences is crucial in developing targeted vaccine communication strategies that address individual concerns and foster informed decision-making. The DUT's commitment to vaccination promotion is critical in safeguarding the well-being of its staff and students. By addressing the concerns and preferences of individuals, providing accurate and transparent information and fostering a culture of open communication, the DUT can play a pivotal role in encouraging vaccine acceptance and contributing to broader public health efforts. Overall, the findings suggest that the participants value accurate and transparent COVID-19 vaccine information that addresses their concerns, dispels myths and helps them make informed decisions about vaccination. Tailoring information to specific groups and aligning with government policies while respecting individual beliefs were also important considerations for the participants.

### **6.6. TRIANGULATION**

#### 6.6.1. Introduction

The quantitative and qualitative research have both highlighted similar trends and principles within the ambit of the current scientific setting. The following common trends and patterns have been identified from the findings emerging from the two approaches: The response to the COVID-19 pandemic has necessitated comprehensive communication and vaccination strategies to curb the spread of the virus. This triangulated analysis aims to synthesize the conclusions drawn from both quantitative and qualitative analyses conducted at the DUT regarding DUT's COVID-19 vaccine communication. By combining the strengths of both methodologies, this triangulation presents common findings and insights that provide a holistic understanding of the dynamics surrounding the implemented COVID-19 vaccine communication by the DUT's COVID-19 RTT.

#### 6.6.2. Employed Communication Channels

Both analyses emphasise the significance of effective communication in shaping responses to the pandemic. Quantitative data indicates that a multifaceted approach encompassing University Pinboard, Webinars, Testing, Weekly campaigns and an Interactive approach

(edutainment) is effective in garnering support and compliance. Qualitative insights resonate with this by revealing that participants appreciated communication via email and PINBOARD systems. The alignment suggests that diverse communication channels play a pivotal role in conveying information effectively. Triangulating the data highlights a correlation between the effectiveness of communication efforts and their influence on vaccination decisions. Quantitative results demonstrate that 46.1% of participants agreed that the DUT's information positively influenced their health behaviour. The qualitative findings corroborate this by showing how personal experiences and expert-led workshops influenced individuals to make informed decisions about vaccination. Convergence underlines the importance of well-designed communication strategies in fostering informed choices.

#### 6.6.3. Sources for COVID-19 Vaccine and Vaccination Information

The link between the multiple sources and personal research indicates that staff and students relied on and used external sources for more COVID-19 vaccine and vaccination information. The qualitative analysis revealed that participants trusted the mass media (TV, radio and newspapers) and consumed more news compared to pre the pandemic. The qualitative analysis collaborates these findings with results of over 60% questionnaire responses indicating the use of mass media as a source for more COVID-19 vaccine and vaccination information. This implies that the mass media has managed to be impartial and accurate and can be the main driver in debunking misinformation.

#### 6.6.4. Verification of COVID-19 Vaccine and Vaccination Information

Both analyses converge on the importance of trust and transparency in communication. Qualitative insights revealed that the participants sought verification from external sources and appreciated transparent communication. This corresponds with the quantitative data, which shows that the participants valued cross-verification of information. The connection underscores the significance of credible and transparent information in fostering trust and ensuring accurate decision-making.

#### 6.6.5. Factors Influencing COVID-19 Vaccination Decision-Making

The interplay between personal beliefs and institutional policies emerged as a consistent theme in both analyses. The qualitative data highlight that vaccination choices are influenced by personal beliefs, external sources and the DUT's COVID-19 RTT's programmes, including mandatory vaccination policies. The quantitative data on influences also reinforces this pattern, showcasing that participants' choices are shaped by a combination of benefits, external information and institutional policies.

#### 6.6.6. Challenges and Recommendations

Aligning quantitative and qualitative findings also sheds light on challenges and potential recommendations. While the quantitative analysis highlights certain communication channels' efficacy, qualitative insights reveal challenges such as inconsistent or unclear communication. By combining these perspectives, it becomes evident that addressing challenges and improving communication clarity are essential for optimising Vaccine Communication effectiveness.

#### 6.6.7. Summary of Triangulation

Triangulating quantitative and qualitative analyses offers a richer understanding of COVID-19 communication and vaccination strategies at DUT. The alignment of the findings underscores the importance of effective communication channels, the influence of well-designed communication on vaccination choices, the role of personal beliefs and external sources and the significance of trust and transparency. While highlighting common trends, the synthesis also uncovers challenges that can be addressed to further enhance communication strategies. Ultimately, this triangulation provides a comprehensive foundation for informed decision-making and policy refinement in navigating the ongoing pandemic landscape.

### **6.7. CONCLUSION**

This chapter discussed the findings in themes that were generated from the overall results presented in Chapter 5. The findings of this study were presented as per the objectives. Both interviews and questionnaire findings were integrated in the discussion of the findings. This allowed the researcher to emphasise the most significant emerged factors associated with vaccination decisions of staff and students. The findings revealed that the case university thoroughly informed, educated and created COVID-19 awareness among staff and students. The DUT's COVID-19 RTT used various formal communication channels to disseminate COVID-19 vaccine and vaccination information to encourage vaccination and emphasise adherence to COVID-19 protocols. However, staff and students indicated that there were challenges with the communication strategy that was implemented by the institution during lockdown and during the stage of COVID-19 vaccine rollout.

Therefore, staff and students explored external sources to gather more information about COVID-19, COVID-19 vaccine and vaccination. Staff and students accessed mass media, informal communication channels such as social media, consulted influential individuals and medical health experts. However, they (staff and students) did not accept the information as it is. This is to be expected as the participants are staff and students at a HEI. Staff and students followed a verification process to check the credibility and validity of COVID-19 information and vaccine that they received from the institution and sourced from external sources before

they took their vaccination decisions. Even though other participants solely trusted the COVID-19 vaccine communication from the university (DUT COVID-19 RTT), DoH and the WHO, other participants used all these sources to cross verify information.

The factors that impacted staff and students' choice of vaccination against COVID-19 were the desire to protect themselves and their family members, side effects and vaccine safety, uncertainty and hesitancy as a result of vaccine related deaths, mandatory policy, the lack of choice, information and the role of government and health authorities, traditional medicine and the DUT's COVID-19 vaccine communication. These findings can guide the management of the case university in creating inclusive policies, tailoring educational approaches and fostering a supportive environment for all the participants. Moreover, researchers can use this data to ensure representativeness in their studies and draw meaningful conclusions that resonate with the diverse perspectives of both the interviewed and surveyed participants. Overall, understanding and acknowledging the diversity encapsulated in these findings is crucial for promoting an inclusive, equitable and harmonious society or workplace. The next chapter will discuss how the objectives of the study were achieved and offer recommendations for future research studies.

## CHAPTER 7

### CONCLUSION AND RECOMMENDATIONS

#### 7.1. INTRODUCTION

The previous chapter discussed the findings of this study as per the objectives and themes. This chapter highlights the identified research problem, discusses how the research objectives were achieved, spells out the new knowledge produced and then posits the limitations of the study. Furthermore, recommendations, future research and policy implications will be discussed.

#### 7.2. PROBLEM, AIM AND OBJECTIVES

##### 7.2.1. Identified research problem

The research problem of this study is the lack of adherence to COVID-19 protocols, excess to external sources for COVID-19 related information and vaccination hesitancy among staff and students. Their vaccination hesitancy stems from the misinformation, myths and rumours posted on informal communication channels as well as the lack of engagement by university platforms to raise issues and concerns about vaccination. The DUT employed formal communication channels to disseminate the COVID-19 vaccine communication to staff and students. However, the university did not effectively implement their COVID-19 response and prevention strategies which influenced staff and students' vaccine choices to vaccinate against COVID-19. Moreover, the COVID-19 vaccine and vaccination information received and externally sourced by staff and students had an influence on their vaccination decision-making.

##### 7.2.2. Research aim

The focus of this study was to investigate the impact of COVID-19 vaccine communication on staff and students' choice to vaccinate against COVID-19 at a South African University. The DUT was used as a case HEI for this study.

##### 7.2.3. Research objectives

To achieve the aim of this study, data gathered were guided by four (4) objectives of this study. Therefore, this section discusses how the study objectives were achieved.

##### 7.2.3.1. *Objective 1 – To identify communication channels used by DUT to create COVID-19 awareness among staff and students.*

The study revealed that the DUT created COVID-19 awareness to staff and students by communicating through formal communication channels such as emails, PINBOARD statements, held meetings, hosted workshops, sent SMSes, posted posters on campus noticeboards and encouraged staff to use a health app to track their COVID-19 symptoms.

The primary formal communication channel used by staff and students was emails and PINBOARD statements. Staff and students revealed that the institution had a COVID-19 RTT that sent them COVID-19 and vaccine information through the identified formal communication channels. The DUT's COVID-19 RTT issued statements updating the university community with statistics of staff and students who contracted the disease, the active cases, the recovered statistics and those who died. Moreover, these statements had messages encouraging staff and students to track their COVID-19 symptoms, test for COVID-19, COVID-19 guidelines, available support services such as the wellness programmes and psychologist.

After the successful COVID-19 vaccine trials nationally, the DUT had its vaccine rollout programme and vaccination stations were available in one clinic in Durban and in one clinic in the Pietermaritzburg campus. The DUT had a campaign called "Vaccination Thursday" where students were encouraged to book and vaccinate for COVID-19 on campus. Workshops were conducted to address vaccine hesitancy and provide health expert perspectives on the virus.

Some participants mentioned disinterest or dissatisfaction with the communication approach by the DUT's COVID-19 RTT stressing that the DUT's COVID-19 vaccine communication was inconsistent and unclear hence they decided not to rely on it to be updated about the COVID-19 and vaccination. The participants felt that the information and messages from the DUT COVID-19 vaccine communication was repetitive and did not use the 'simple language' appealing to staff and students to convey the messages. Nonetheless, some participants appreciated the efforts made by the DUT to form the COVID-19 RTT to constantly update staff and students about COVID-19. Over 60% of the participants indicated that the DUT thoroughly informed, educated and created COVID-19 awareness among the university community.

Nevertheless, few participants expressed that staff and students from the Pietermaritzburg campuses were neglected compared to staff and students at the Durban campuses where most COVID-19 campaigns were prioritised. As of early 2023, the only active vaccination station was at one clinic on the Durban campus but still the DUT still encouraged staff and students to vaccinate. This implies that the institution priorities health and safety only for staff and students at the Durban campuses. To access COVID-19 and vaccine information, staff and students did not only rely on the DUT formal communication channels. The participants did more research about COVID-19 and vaccine information using informal communication channels like social media and blogs. Furthermore, the participants listened to the radio, watched TV, read newspapers, used the DoH and the WHO websites to seek more information about COVID-19 and vaccines. As much as staff and students preferred emails and PINBOARD as their primary formal communication channels, they used other engaging

platforms such as social media to share their opinions and to be updated about the current COVID-19 pandemic in an informal manner.

The findings revealed that staff and students used mass media to bridge the gap of COVID-19 and vaccine information. TV, radio and newspapers provided COVID-19 and vaccine information from the health experts' perspective. Additionally, staff and students had conflicting views on how they perceived the COVID-19 vaccine information disseminated by the DUT. In the findings most participants expressed that the information was up to date and easily understood. However, few participants stated that the information was emailed late. This suggests that staff and students did not only rely on the DUT's formal communication channels to be educated, informed and to be aware about the COVID-19 vaccine. This objective was achieved with the collected data as the findings revealed that the most used and preferred DUT's formal communication channel by staff and students to be updated about COVID-19 and vaccine information was the formal channels. Furthermore, staff and students mentioned that DUT disseminated COVID-19 information that made them aware about COVID-19 and vaccination.

*7.2.3.2. Objective 2 – To explore staff and students' source for COVID-19 vaccine and vaccination information.*

The participants sourced for COVID-19 vaccine and vaccination information from various sources, indicating a proactive approach to staying informed about COVID-19 vaccines. Staff and students used multiple sources like TV, radio, newspapers, social media, academic sources, online articles, the DoH websites and consultations with professionals from the medical field. The participants expressed that they listened to the radio because the information related to COVID-19 was readily available and they watched impartial news channels to gather the facts about COVID-19 and the availability of vaccines. Personal research through academic articles and expert interviews played a significant role in decision-making. The participants who were engaged in academic activities such as research and publishing academic articles sourced COVID-19 vaccine information from the medical field's scholarly articles.

Moreover, some staff and students consulted with medical professionals who were doctors, pharmacists and nurses. Trust in medical professionals and government updates influenced some participants' vaccination decisions. Furthermore, some participants trusted government updates because they use the DoH websites and used the social media platform called Twitter to track daily tweets of the influential people like the Minister of Health in South Africa. Furthermore, the participants also explored their university's formal communication channel such as university pinboard to learn more about COVID-19 vaccine and vaccination. This

implies that the participants trusted their institution in terms of accurate information. This objective was achieved because staff and students indicated that they used multiple sources of information but most participants sourced COVID-19 information and vaccine from TV, radio and newspapers. This implies that researching for more information is important and staff and students can use multiple sources to learn more about COVID-19 vaccine and vaccinating hence they used sources that they perceived to be credible for them at that time.

*7.2.3.3. Objective 3 – To explore the process used by staff and students to verify COVID-19 vaccine and vaccination information.*

The participants expressed trust in information from the DUT when it came from established and reliable sources like the WHO and the DoH. Most interviewed participants used external sources to verify COVID-19 information disseminated by the DUT's COVID-19 RTT. They consulted with medical professionals such as doctors, pharmacists and nurses. The participants claimed to spot a gap from the information sent by the DUT to staff and students as it was sent late to the university community. Therefore, they decided to cross-verify information from the DUT by consulting multiple external sources, including different news channels, health experts, scholarly articles and medical professionals. The participants also highlighted that the COVID-19 information sent by the DUT to students did not address the myths about COVID-19 that staff and students were exposed to. Thus, they read published medical articles and scholarly articles.

The verification process stemmed from the unclear and inconsistent COVID-19 information, the need to research more about COVID-19 and from the personal choice of not relying only on one source of information. Some participants indicated limited verification or no verification, relying on their trust in the university or the DoH. Other participants claimed that the information that was seen on TV, heard on the radio, read in the newspapers was one-sided, repetitive and pro vaccination like the COVID-19 information sent by the DUT. As a result, they cross verified COVID-19 information broadcast on mass media (TV, radio and newspapers) with community leader's statements and the WHO statements. This emphasises the importance of cross verifying COVID-19 information and vaccination information before interpreting it as fact. This objective was achieved as staff and students revealed that they used multiple sources to verify COVID-19 information and vaccination information that they personally sourced as well as the information sent by the DUT's COVID-19 RTT.

*7.2.3.4. Objective 4 – To determine COVID-19 vaccine information and vaccination information that influences staff and students' vaccination decision-making.*

The COVID-19 vaccine and vaccine information that influenced staff and students' choice to vaccinate was to protect the self and family which emerged as the most common and

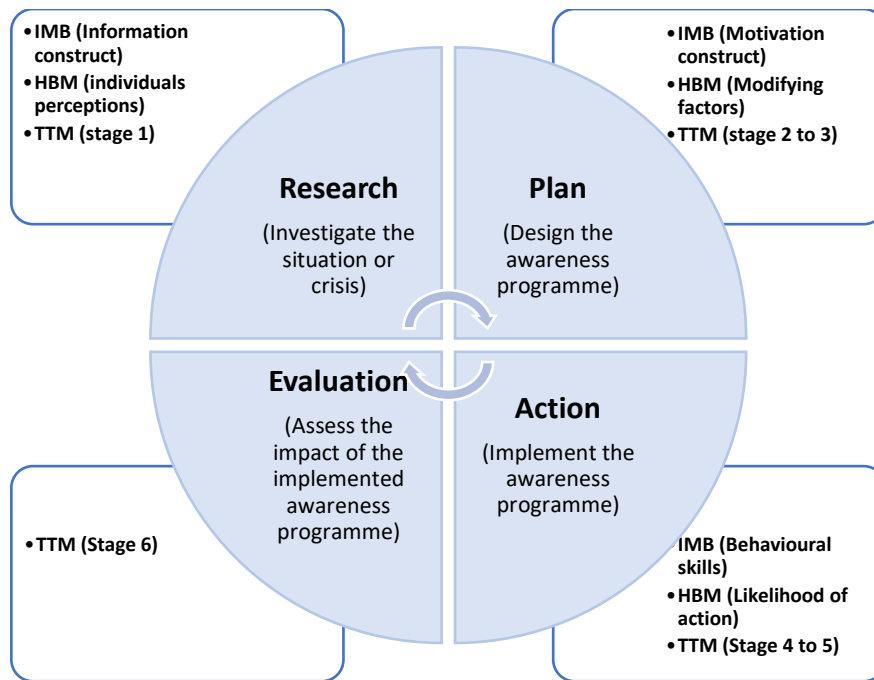
significant influencer for getting vaccinated. While others were influenced by concerns about side effects, safety and uncertainty regarding vaccine-related information. Moreover, other participants were influenced by the mandatory policy, trust in government and health authorities, the desire to travel and job security and the consideration of traditional medicine.

The influence of DUT's communication tools that were used to disseminate COVID-19 vaccine information varied among participants on vaccination decisions hence the participants emphasised that the health expert reassurances and information from external sources played a role in influencing their vaccination choices. The mandatory vaccination policy and job security were significant factors in some participant's decision-making process. Moreover, fear of job loss and reminders of the pandemic's impact were also factors influencing vaccination choices. This indicates that the message communicated was more powerful than the tools of communication used to communicate the COVID-19 vaccine information because the participants relied on information gathered from external sources rather than internal sources.

The participants indicated that the COVID-19 information and vaccine information sent by the DUT was not satisfactory. The type of COVID-19 information and vaccine information that they wished to be shared was: Understanding Vaccine Mechanics and Body Response, Addressing Misinformation and Conspiracy Theories, Comprehensive Pros and Cons of Vaccination, Information on Vaccine Variants and Long-Term Effects, Access to Different Vaccines and Comparative Information, Aligning with Government Policies, Reassurance and Transparency, Information for Specific Groups and Addressing Myths and Cultural Beliefs. The vaccine information that is more likely to influence the participants decision about COVID-19 vaccine and vaccination were: Perceived benefit of the vaccine, mode of administration, effectiveness of the vaccine, availability of the vaccine, regulatory information, perceived risks of the vaccine, possible and long-term side effects.

### **7.3. NEW KNOWLEDGE**

To develop and implement effective COVID-19 vaccine communication, the DUT's COVID-19 RTT can use theory and the best evidence available through the four steps problem solving process proposed by Brown (2012). According to Brown (2012), the four steps problem solving process are Research, Planning and Programming, Implementation (of actions and communication) and Evaluation. These steps can be integrated with three identified theories for this study; (see Figure 18 below) namely, Information Motivation Behavioural skills model, Health Belief Model and Transtheoretical model. Figure 18 presents the proposed model to effectively implement vaccine communication, and it is guided by the research findings.



**Figure 18 – Proposed model to integrate the four steps problem solving process with three theories, namely the Information Motivation Behavioural Skills Model, Health Belief Model and Transtheoretical model. Source: Authors own illustration (2024)**

The efficacy of COVID-19 vaccine communication is depended on the success of properly incorporating the Figure 18 above. In the context of this study, the DUT’s COVID-19 RTT can follow these steps to successfully execute a COVID-19 awareness programme.

### 7.3.1. Step 1- Research

In this step the DUT’s COVID-19 RTT need to conduct research that will extensively define the problem or crisis. This step is a foundation and involves the process of investigating what is known about the crisis and they can monitor staff and students’ attitudes and behaviour towards the identified problem. In the context of this study, the problem is vaccine hesitancy and the DUT’s COVID-19 RTT is tasked with the development and implementation of COVID-19 vaccine communication to encourage vaccination. The Information Motivation Behavioural skills model information construct emphasises on providing clear information to create COVID-19 vaccine awareness. Staff and students need to be informed about the availability of COVID-19 vaccines, vaccination stations and vaccination procedures. Once staff and students are informed that there is no cure for COVID-19 and vaccines are available to combat the infection, the DUT’s COVID-19 RTT need to investigate staff and students’ individual perceptions, especially the perceived susceptibility and perceived severity through the Health Belief Model. Moreover, stage one (precontemplation) of Transtheoretical Model emphasises on informing staff and students about the risks of transmission and prevention measures hence it is important that when the DUT’s COVID-19 RTT probes the problem, they need to indicate why

it is it a problem, who can be affected and how. This information will assist staff and students to proceed to stage two (contemplation) of the Transtheoretical Model.

### 7.3.2. Step 2 - Plan

In this step, the DUT's COVID-19 RTT use the information gathered in step one as a guide to develop a response program which is an awareness programme. This step involves including the step one findings into the planning of the awareness programme and policies of the university. The motivation construct of Information Motivation Behavioural skills model emphasises personal and social motivation. Personal motivation relates to planning to vaccinate for COVID-19 to protect oneself and family members. Therefore, the vaccination decision is impacted by personal, religious and cultural beliefs. The Health Belief Model modifying factors are perceived threats and cues to action. Therefore, the DUT's COVID-19 RTT needs to monitor staff issues and behaviour that will more likely impact their vaccination decisions.

Stage two (contemplation) and stage three (preparation) of Transtheoretical Model are crucial in planning for awareness programmes and the development of the COVID-19 vaccine communication for staff and students. Even though staff and students are aware and understand the importance of vaccination they need to be prepared to progress to the next stage of Transtheoretical Model hence the DUT's COVID-19 RTT need to plan engaging small tasks that builds momentum and aim to achieve the objectives of the awareness programme and impact vaccination decisions. These small tasks will serve as a reminder strategy that aims to influence staff and students' choice of vaccination and minimise vaccine hesitancy.

### 7.3.3. Step 3 - Action

In this step, the DUT's COVID-19 RTT execute the planned awareness programme in step two. It is crucial to have a full proof implementation strategy to strengthen the trust between the university and its stakeholders. Therefore, the programme of action needs to have clear tactics intended to achieve the objectives of the awareness programme. The behavioural skills construct in Information Motivation Behavioural skills model emphasis on providing training that impacts vaccination decisions. Here, staff and students will be taught how to schedule vaccination appointments, how to access vaccination stations and how to maintain the vaccination behaviour. Once they are fully trained, they reassess their vaccination decisions. That is why Health Belief Model cues to action informed the perceived benefits associated with behaviour change. In this step, the benefits such as a possibility to return to normal and minimising the chances of contracting COVID-19 can impact staff and students' vaccination decisions. In reference to the Health Belief Model perceived barriers can influence vaccine hesitancy. Therefore, the DUT's COVID-19 RTT need to use their formal communication

channels to disseminate information that addresses perceived barriers such as debunking misinformation and addressing concerns related to COVID-19 vaccine safety and efficacy. Stage four (action) and stage five (maintenance) of Transtheoretical Model emphasises two things, vaccination and booster shots. Staff are expected to vaccinate with all the required COVID-19 vaccine doses to be fully vaccinated. The role of the DUT's COVID-19 RTT in this stage is to provide assurance and acknowledge staff and students' efforts to combat the spread of COVID-19 through their COVID-19 vaccine communication.

#### 7.3.4. Step 4 - Evaluation

The final step requires the DUT's COVID-19 RTT to evaluate the impact of the implemented awareness programme. Evaluation provides an indication of whether the programme should be modified, terminated or continued. There are different types of evaluation strategies that can be used to assess whether the implemented programme and its objectives were achieved. This stage is dependent on whether the COVID-19 pandemic is controlled or not. In the context of this study, in this stage, the DUT's COVID-19 RTT need to investigate the lessons learned after the implementation of the COVID-19 vaccine awareness programme. This can be done through analysing the numbers of the vaccinated population, the modifying factors will be the vaccination status (dropped out, fully vaccinated and unvaccinated) of vaccinated staff and students. This analysis will be in line with stage six (termination) of Transtheoretical Model which is applicable because of vaccination dropouts. Therefore, the university's COVID-19 RTT need to develop and implement new interventions strategies tailored for staff and students who are hesitant to receive booster shots.

### 7.4. LIMITATIONS

This study focused on the DUT and no other HEIs. The study is limited to a South African UoT located in Pietermaritzburg, KZN; and the targeted participants are in three Departments (the Department of Applied Management, Finance and Information Management and Public Management Law & Economics) from the Faculty of Management Sciences and the Faculty of Accounting and Informatics. The findings will only apply to the targeted population and will not be generalised to other UoT in KZN or a different department or a different Faculty in the institution and other HEIs outside the DUT. Furthermore, the limitation of this study was the non-participation from the targeted population. The researcher faced a challenge of lack of urgency in response time from the participants, as such recruitment of participants took longer than the projected timelines. Other participants felt that the research topic was 'too close' to them hence the hesitancy in participation. To overcome this challenge, the researcher extended time to collect data which affected number of years registered for the qualification. Moreover, during the interviews two participants dropped out because they felt that the questions that were asked were too personal, and they struggled to respond objectively. The

other limitation is that the study only focused on one disease which is COVID-19 and not any other diseases with respect to vaccination hence the findings are limited to the COVID-19 pandemic only.

## **7.5. RECOMMENDATIONS**

The recommendations for this study are linked with the identified research problem, results (data presentation) and discussion of findings for this study and are presented per objectives of this study. The recommendations of this study are discussed below.

### **7.5.1. Communication Strategy**

For effective vaccine communication, the DUT need to understand their target audience before disseminating COVID-19 vaccine information. This will allow the DUT to customise messages that will be easily understood by stakeholders, especially students hence the DUT need to interactively engage with students when developing vaccine communication. The Information Motivation Behaviour skills model emphasises the important responsibility of the COVID-19 RTT to provide accurate, clear and easily accessible COVID-19 vaccine information, COVID-19 vaccine communication, promote positive attitudes and address concerns related to vaccination by fostering motivation and support staff and student's self-efficacy and equip them with behavioural skills to adopt health behaviour by adhering to COVID-19 protocols and vaccinating. The university's COVID-19 RTT can integrate the IMB skills model in their communication approach to address vaccine hesitancy, myths and misinformation, disseminate factual and evidence-based COVID-19 vaccine information and provide easily understood instructions to schedule appointments for vaccination.

The Information Motivation Behavioural skills model recommends that the COVID-19 RTT need to equip staff and students with the necessary skills needed to adhere to COVID-19 protocols and accept vaccination. Therefore, the DUT should form university advocacy initiatives to encourage COVID-19 vaccination through stakeholder engagement. This can be done through the integration of the Health Belief Model to the communication approach by providing accurate and clear information, addressing myths and misinformation. Furthermore, the university's COVID-19 RTT can integrate the Transtheoretical Model in their communication approach by identifying interventions and tailor vaccination information messages for each stage whilst encouraging vaccine acceptance. This can be done by offering vaccination resources such as easily accessible vaccination stations and reinforcement of vaccination by reminding staff and students to get vaccination booster shots to be fully vaccinated. To influence vaccine decisions, the university's COVID-19 RTT can highlight the consequences of being unvaccinated by incorporating the HBM in their vaccine communication.

### 7.5.2. Promotion of COVID-19 Vaccine and Vaccine Acceptance

As discussed in the literature, in South Africa, vaccination trials were conducted and concluded successfully. The health experts and various sectors had to create awareness about the availability of the vaccine and vaccine rollout programmes. The DUT followed these examples by rolling out their own vaccination programmes on their campuses. The DUT's COVID-19 RTT had to communicate with staff and students about where and when and how they can vaccinate. The findings revealed that the DUT's COVID-19 RTT communicated COVID-19 vaccine information through formal communication channels. The most promoted DUT vaccination campaign is called #VaccinationThursday where staff and students were encouraged to book for their vaccination doses and boosters. However, the DUT has since limited their vaccination stations to one campus in Durban. This can lead to vaccination dropout since there are vaccination stations from other campuses and the lack of practicality to travel from campus to campus to vaccinate. Before the DUT took the decision to have one active vaccination station they should have consulted with staff and students. With the existing relationship between the DUT and the KZN DoH, they can expand their COVID-19 safety measures and ensure that all DUT campuses have active vaccination stations.

### 7.5.3. Vaccination Delivery Strategy

According to Mantel and Cherian (2020) for vaccines to be successfully implemented they need to be included in the primary health care to optimise vaccination schedules for all individuals. Furthermore, Mantel and Cherian (2020: 30) advocate for people centred immunisation delivery strategies "as part of primary health care in order to reach universal health coverage". In the context of this study, the case university need to collaborate with medical aid schemes who are already offering their services or packages for university staff. This collaboration will formalise a vaccination delivery strategy that allows staff to schedule vaccine appointments for them and their dependents as per their medical aid packages. This vaccination delivery strategy will be inclusive of designated health care experts for the whole family who will be available virtually and disseminate vaccination reminders. Furthermore, to honour doctor patient confidentiality, vaccines can be administered through house calls or at the discretion of the case university staff.

### 7.5.4. Health Promotion

The COVID-19 pandemic put pressure on the health systems globally. HEIs need to strategically implement response strategies that will incorporate health issues that existed before the COVID-19 pandemic. Moreover, universities need to understand the impact of COVID-19 for staff and students by ensuring that proper vaccine communication goals are met. To align with the institutions ENVISION2030 values, students need to be included in the development of health promotion campaigns in a university. This will indicate transparency

and strengthen trust among the university and students to influence vaccination decisions in a university community. In future, the application of TTM to explore the impact of COVID-19 vaccine communication on staff and students' choice to vaccinate for COVID-19 in a university can assist the COVID-19 RTT to develop response strategies and prevention strategies for staff and students' needs for a specific stage of the behaviour change process and eventually increase vaccine acceptance.

## **7.6. POLICY IMPLICATIONS and FUTURE RESEARCH**

The practicality and regulatory procedures of seeking alternative or traditional medicine to mitigate the spread of the COVID-19 pandemic should be investigated in South Africa as the country has different populations and communities who priorities their beliefs and culture. The findings could serve as terms of reference for health policy makers when developing response strategies for health crisis. South African citizens continue to face the risk of contracting COVID-19 and HIV/AIDS because of stigma and misinformation. Researchers can investigate how to respond to concurrent pandemics as they pose a threat to human life and public health. The findings could assist the DoH policy makers with response strategies that addresses concurrent pandemics for the purpose of not neglecting the current response strategies for the pandemic that occurred first.

This study was conducted in one South African UoT and only focused on lecturers and postgraduate students. Future research studies can be comparative research with large population between staff who are in health support services and those who are in academics. The COVID-19 vaccine hesitancy studies in universities among staff and students are currently limited to Canada (Mant *et al.* 2021), the Czech Republic (Riad *et al.* 2021), Italy (Barello *et al.* 2020; Baccolini *et al.* 2021), Lebanon (Hamdan *et al.* 2021) and Pakistan (Sadaqat *et al.* 2021) and there is a gap in studies conducted from an African perspective. The COVID-19 vaccine hesitancy studies need to be conducted to investigate the factors that influence the youth, especially students vaccine hesitancy (George *et al.* 2022). Furthermore, a comprehensive South African UoT studies is recommended to investigate similar characteristics among staff and students related to vaccine hesitancy. Future research can incorporate several institutions both educational and non-educational and investigate the perceptions and factors associated with COVID-19 vaccination by investigating lessons learned during the vaccination rollout.

## **7.7. CONCLUSION**

This chapter provided the research summary, the summary of the problem statements and highlighted how the research objectives were achieved. Furthermore, this chapter proposed recommendations on minimising vaccine hesitancy. The factors that influence staff and

students' choice to vaccinate can be used as a reference for future vaccine communication. Future research and the policy implications of this study can assist the case university with their health policies. The findings cannot be generalised for other countries, universities and other departments within the university. The delayed responses for surveys, interviewee dropout and the lack of confirmed availability to participate in the study affected the researcher's timeline to finalise the study. Moreover, the small sample of the selected population may not accurately represent vaccine hesitancy for other staff and students. Therefore, the findings are only applicable to lecturers and postgraduate students in the Faculty of Management Sciences and Faculty of Accounting and Informatics from the Department of Applied Management, Finance and Information Management and Public Management Law & Economics. In conclusion, the identified research limitations can be noted for future research studies.

## LIST OF REFERENCES

- Ab Halim, R., Abd Jabar, F., Mohamad, S. A., Azer, I. and Ab Halim, N. 2011. Assessing the effectiveness of conventional notice board in universities' information delivery/Roslilee Ab. Halim...[et al.]. *Gading Journal for the Social Sciences*, 15 (1): 49-58.
- Abdalla, M. M., Oliveira, L. G. L., Azevedo, C. E. F. and Gonzalez, R. K. 2018. Quality in qualitative organizational research: Types of triangulation as a methodological alternative. *Administração: ensino e pesquisa*, 19 (1).
- Abdallah, D. A. and Lee, C. M. 2021. Social norms and vaccine uptake: College students' COVID vaccination intentions, attitudes, and estimated peer norms and comparisons with influenza vaccine. *Vaccine*, 39 (15): 2060-2067.
- Abdool Karim, S., Kruger, P. and Hofman, K. 2020. Industry strategies in the parliamentary process of adopting a sugar-sweetened beverage tax in South Africa: a systematic mapping. *Globalization and Health*, 16 (1): 1-14.
- Abdullahi, A. M. 2022. Social and behaviour change communication as an approach for effective health promotion in Nigeria. *Journal of Media, Communication & Languages*, 6 (1): 147-156.
- Aborode, A. T., Olofinsao, O. A., Osmond, E., Batubo, A. P., Fayemiro, O., Sherifdeen, O., Muraina, L., Obadawo, B. S., Ahmad, S. and Fajemisin, E. A. 2021. Equal access of COVID-19 vaccine distribution in Africa: Challenges and way forward. *Journal of Medical Virology*, 93 (9): 5212-5215.
- Ackah, B. B., Woo, M., Stallwood, L., Fazal, Z. A., Okpani, A., Ukah, U. V. and Adu, P. A. 2022. COVID-19 vaccine hesitancy in Africa: a scoping review. *Global Health Research and Policy*, 7 (1): 21.
- Adam, M., Bärnighausen, T. and McMahon, S. A. 2020. Design for extreme scalability: a wordless, globally scalable COVID-19 prevention animation for rapid public health communication. *Journal of Global Health*, 10 (1).
- Aguado-Guadalupe, G. and Bernaola-Serrano, I. 2020. Verification in the Covid-19 infodemic. Newtral's case study. *Revista latina de comunicación social*, Article ID(78): 289-307.
- Al-Youbi, A. O., Al-Hayani, A., Bardesi, H. J., Basher, M., Lytras, M. D. and Aljohani, N. R. 2020. The King Abdulaziz University (KAU) pandemic framework: a methodological approach to leverage social media for the sustainable management of higher education in crisis. *Sustainability*, 12 (11): 4367.
- Ajani, O. A. 2023. How digital divide lingers on in south african higher education: lived experiences of rural students during the covid-19 pandemic. Article ID.
- Ajayi, A. I., Mudefi, E. and Owolabi, E. O. 2021. Prevalence and correlates of sexual violence among adolescent girls and young women: findings from a cross-sectional study in a South African university. *BMC Women's Health*, 21: 1-9.
- Ajayi, V. O. 2017. Primary sources of data and secondary sources of data. *Benue State University*, 1 (1): 1-6.
- Akhtar, M. I. 2016. Research design. Available: <https://ssrn.com/abstract=2862445> (Accessed 23 September 2021).

Al-Kumaim, N. H., Alhazmi, A. K., Mohammed, F., Gazem, N. A., Shabbir, M. S. and Fazea, Y. 2021. Exploring the impact of the COVID-19 pandemic on university students' learning life: An integrated conceptual motivational model for sustainable and healthy online learning. *Sustainability*, 13 (5): 2546.

Al-Mohaithef, M. and Padhi, B. K. 2020. Determinants of COVID-19 vaccine acceptance in Saudi Arabia: a web-based national survey. *Journal of Multidisciplinary Healthcare*, Article ID: 1657-1663.

Al-Turk, F., Akour, A. and Farha, R. A. 2022. The impact of an educational workshop on counteracting hesitancy toward the COVID-19 vaccine among pharmacy students in Jordan. *Journal of Applied Pharmaceutical Science*, 12 (8): 095-101.

Aldiabat, K. M. and Le Navenec, C.-L. 2018. Data saturation: The mysterious step in grounded theory methodology. *The Qualitative Report*, 23 (1): 245-261.

Aleksandrova, Y. G. and Parusheva, S. S. 2019. Social media usage patterns in higher education institutions—An empirical study. *International Journal of Emerging Technologies in Learning (Online)*, 14 (5): 108.

Alex, J. 2022. Impact of the COVID-19 pandemic on the academic life of higher education students: A rural South African perspective from a global study. *South African Journal of Higher Education*, 36 (1): 20-40.

Ali, BJ, Anwar, G., Gardi, B., Othman, BJ, Aziz, HM, Ahmed, SA, Hamza, PA, Ismael, NB, Sorguli, S., Sabir, B.Y. 2021. Business Communication Strategies: Analysis of Internal Communication Processes. *Journal of Humanities and Education Development*, 3 (3): 16-38.

Ali, N., Ashiru-Oredope, D. and Murdan, S. 2021. Training university students as vaccination champions to promote vaccination in their multiple identities and help address vaccine hesitancy. *Pharmacy Education*, 21 (1): 407-419.

Aljazeera. 2020. *Racism row as French Doctors suggest virus vaccine test in Africa*. Available: <https://www.aljazeera.com/news/2020/4/4/racism-row-as-french-doctors-suggest-virus-vaccine-test-in-africa> (Accessed 12 January 2024).

Almossawi, H., Longacre, C. F., Pillay, Y. and Kak, N. 2019. A Social and Behavior Change Communication Framework for Addressing Delays to Appropriate TB Care and Treatment. *Journal of Lung Health and Diseases*, Article ID.

Altmeyer, M., Lessel, P., Muller, L. and Krüger, A. 2019. Combining behavior change intentions and user types to select suitable gamification elements for persuasive fitness systems. In: *Proceedings of Persuasive Technology: Development of Persuasive and Behavior Change Support Systems: 14th International Conference, PERSUASIVE 2019, Limassol, Cyprus, April 9–11, 2019, Proceedings 14*. Springer, 337-349. Available: [https://link.springer.com/chapter/10.1007/978-3-030-17287-9\\_27](https://link.springer.com/chapter/10.1007/978-3-030-17287-9_27) (Accessed 29 January 2024).

Andigema, A. S. and Cyrielle, N. N. T. 2024. Addressing Vaccine Hesitancy: A Review of Factors Contributing to Vaccine Refusal and Effective Communication Strategies for Promoting Vaccine Acceptance. Article ID.

- Anjorin, A. A. 2020. The coronavirus disease 2019 (COVID-19) pandemic: A review and an update on cases in Africa. *Asian Pacific Journal of Tropical Medicine*, 13 (5): 199-203.
- Anjorin, A. A., Abioye, A. I., Asowata, O. E., Soipe, A., Kazeem, M. I., Adesanya, I. O., Raji, M., Adesanya, M., Oke, F. A. and Lawal, F. J. 2021. Comorbidities and the COVID-19 pandemic dynamics in Africa. *Tropical Medicine & International Health*, 26 (1): 2-13.
- Ansari, J. A. N. and Khan, N. A. 2020. Exploring the role of social media in collaborative learning the new domain of learning. *Smart Learning Environments*, 7 (1): 1-16.
- Apuke, O. D. and Omar, B. 2021. Fake news and COVID-19: modelling the predictors of fake news sharing among social media users. *Telematics and Informatics*, 56: 101475.
- Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N. and Umek, L. 2020. Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability*, 12 (20): 8438.
- Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelov, K., Robinson, S., Levy, S., Simbanegavi, W., van Seventer, D. and Anderson, L. 2020. Covid-19 lockdowns, income distribution, and food security: An analysis for South Africa. *Global Food Security*, 26: 100410.
- Asenahabi, B. M. 2019. Basics of research design: A guide to selecting appropriate research design. *International Journal of Contemporary Applied Researches*, 6 (5): 76-89.
- Ashbaugh, A. R., Herbert, C. F., Saimon, E., Azoulay, N., Olivera-Figueroa, L. and Brunet, A. 2013. The decision to vaccinate or not during the H1N1 pandemic: selecting the lesser of two evils? *PLoS One*, 8 (3): e58852.
- Avenier, M.-J. and Thomas, C. 2015. Finding one's way around various methodological guidelines for doing rigorous case studies: A comparison of four epistemological frameworks. *Systèmes d'information et Management*, 20 (1): 61-98.
- Aydemir, C. and Özsoy, S. A. 2020. Environmental impact of printing inks and printing process. *Journal of Graphic Engineering and Design*, 11 (2): 11-18.
- Azman, N. and Abdullah, D. 2021. A critical analysis of Malaysian Higher Education Institutions' response towards Covid-19: sustaining academic program delivery. *Journal of Sustainability Science and Management*, 16 (1): 70-96.
- Baccolini, V., Renzi, E., Isonne, C., Migliara, G., Massimi, A., De Vito, C., Marzuillo, C. and Villari, P. 2021. COVID-19 vaccine hesitancy among Italian university students: a cross-sectional survey during the first months of the vaccination campaign. *Vaccines*, 9 (11): 1292.
- Badat, S. 2010. The challenges of transformation in higher education and training institutions in South Africa. *Development Bank of Southern Africa*, 8 (1): 1-37.
- Bahige, N. 2019. The perception of university students on the diffusion of fake news on social media: a case of the University of KwaZulu-Natal (UKZN). Article ID. Available: <https://ukzn-dspace.ukzn.ac.za/handle/10413/16822> (Accessed 12 December 2022).
- Bajos, N., Spire, A., Silberzan, L., Sireyjol, A., Jusot, F., Meyer, L., Franck, J.-E., Warszawski, J. and Group, E. S. 2022. When lack of trust in the government and in scientists reinforces social inequalities in vaccination against COVID-19. *Frontiers in Public Health*, 10: 908152.

Balakrishnan, V., Ng, K. S. and Rahim, H. A. 2021. To share or not to share—The underlying motives of sharing fake news amidst the COVID-19 pandemic in Malaysia. *Technology in Society*, 66: 101676.

Balvers, M., MacMullin, A., Berman, P. and Kandlikar, M. 2021. Evaluating the South African COVID-19 Lockdown Response through Political, Organizational & Governance Factors: A Case Study. Article ID.

Bannour, I., Bannour, B., Frigui, R., Bannour, R. and Kheiri, H. 2020. Sexually transmitted diseases: what is the knowledge of college students in Tunisia? *European Journal of Public Health*, 30 (Supplement\_5): ckaa166. 852.

Bantjes, J., Swanevelder, S., Jordaan, E., Sampson, N. A., Petukhova, M. V., Lochner, C., Stein, D. J. and Kessler, R. C. 2023. COVID-19 and common mental disorders among university students in South Africa. *South African Journal of Science*, 119 (1-2): 1-10.

Bardosh, K., De Figueiredo, A., Gur-Arie, R., Jamrozik, E., Doidge, J., Lemmens, T., Keshavjee, S., Graham, J. E. and Baral, S. 2022. The unintended consequences of COVID-19 vaccine policy: why mandates, passports and restrictions may cause more harm than good. *BMJ Global Health*, 7 (5): e008684.

Barello, S., Nania, T., Dellafiore, F., Graffigna, G. and Caruso, R. 2020. 'Vaccine hesitancy' among university students in Italy during the COVID-19 pandemic. *European Journal of Epidemiology*, 35: 781-783.

Barua, Z., Barua, S., Aktar, S., Kabir, N. and Li, M. 2020. Effects of misinformation on COVID-19 individual responses and recommendations for resilience of disastrous consequences of misinformation. *Progress in Disaster Science*, 8: 100119.

Basch, C. E., Basch, C. H., Hillyer, G. C., Meleo-Erwin, Z. C. and Zagnit, E. A. 2021. YouTube videos and informed decision-making about COVID-19 vaccination: successive sampling study. *JMIR Public Health and Surveillance*, 7 (5): e28352.

Beattie, I. R. 2018. Sociological perspectives on first-generation college students. In: *Handbook of the sociology of education in the 21<sup>st</sup> century*. Springer, 171-191.

Benzer, J. K., Beehler, S., Cramer, I. E., Mohr, D. C., Charns, M. P. and Burgess, J. F. 2013. Between and within-site variation in qualitative implementation research. *Implementation Science*, 8: 1-14.

Berger, V. W. and Zhou, Y. 2014. Kolmogorov–smirnov test: Overview. Wiley statsref: Statistics reference online, Article ID.

Bhasin, H. 2021. Communication Strategy – Definition, Importance, Types and Success. *Marketing91* (Blog). Available: <https://www.marketing91.com/communication-strategy/> (Accessed 12 December 2022).

Bish, A., Yardley, L., Nicoll, A. and Michie, S. 2011. Factors associated with uptake of vaccination against pandemic influenza: a systematic review. *Vaccine*, 29 (38): 6472-6484.

Black, S. A. 2015. Qualities of effective leadership in higher education. *Open Journal of Leadership*, 4 (02): 54.

Bode, L. and Vraga, E. K. 2018. See something, say something: correction of global health misinformation on social media. *Health Communication*, 33 (9): 1131-1140.

Boëlle, P.-Y. and Valdano, E. 2024. The importance of increasing primary vaccinations against COVID-19 in Europe. *Infectious Disease Modelling*, 9 (1): 1-9.

Borah, P. and Xiao, X. 2018. The importance of 'likes': The interplay of message framing, source, and social endorsement on credibility perceptions of health information on Facebook. *Journal of Health Communication*, 23 (4): 399-411.

Bothun, L. S., Feeder, S. E. and Poland, G. A. 2022. Readability of COVID-19 vaccine information for the general public. *Vaccine*, 40 (25): 3466-3469.

Bowen, C. D., Summersill, A. R., Google, A. N., Aadnes, M. G. and Barnes, M. E. 2023. Exploring Black Undergraduate Students' Communication and Biology Education Experiences about COVID-19 and COVID-19 Vaccines During the Pandemic. *CBE—Life Sciences Education*, 22 (4): ar42.

Braun, V. and Clarke, V. 2021. To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health*, 13 (2): 201-216.

Brennan, J., King, R. and Lebeau, Y. 2004. The role of universities in the transformation of societies. Synthesis Report. Centre for Higher Education Research and Information/Association of Commonwealth Universities, UK, 72.

Brennan, L., Klassen, K., Weng, E., Chin, S., Molenaar, A., Reid, M., Truby, H. and McCaffrey, T. A. 2020. A social marketing perspective of young adults' concepts of eating for health: is it a question of morality? *International Journal of Behavioral Nutrition and Physical Activity*, 17 (1): 1-14.

Brewer, N. T., Chapman, G. B., Rothman, A. J., Leask, J. and Kempe, A. 2017. Increasing vaccination: putting psychological science into action. *Psychological Science in the Public Interest*, 18 (3): 149-207.

Brindha, M. D., Jayaseelan, R. and Kadeswara, S. 2020. Social media reigned by information or misinformation about COVID-19: a phenomenological study. *Alochana Chakra Journal*, 9 (5): 585-602.

Briscoe, C. and Aboud, F. 2012. Behaviour change communication targeting four health behaviours in developing countries: a review of change techniques. *Social Science & Medicine*, 75 (4): 612-621.

Brown, B. D. 2012. *Strategic Public Relations An Audience focused Approach*:. Cengage Learning: Wadsworth.

Bryan, M. A., Gunningham, H. and Moreno, M. A. 2018. Content and accuracy of vaccine information on pediatrician blogs. *Vaccine*, 36 (5): 765-770.

Bryman, Bell, Hirschsohn, Santos, D. and Toit, D. 2014. *Research Methodology: Business and Management Contexts*. Oxford University Press Southern Africa (Pty) Limited.

Burki, T. K. 2020. COVID-19: consequences for higher education. *The Lancet Oncology*, 21 (6): 758.

Burns, D., Dagnall, N. and Holt, M. 2020. Assessing the impact of the COVID-19 pandemic on student wellbeing at universities in the United Kingdom: A conceptual analysis. In:

Proceedings of Frontiers in Education. Frontiers, 204. Available: <https://doi.org/10.3389/feduc.2020.582882> (Accessed 11 July 2021).

Caballero, A., Leath, K. J. and Staton, A. D. 2023. Strategic combination of theory, plain language, and trusted messengers contribute to COVID-19 vaccine uptake: lessons learned from development and dissemination of a community toolkit. *Vaccines*, 11 (6): 1064.

Callaghan, T., Moghtaderi, A., Lueck, J. A., Hotez, P. J., Strych, U., Dor, A., Franklin Fowler, E. and Motta, M. 2020. Correlates and disparities of COVID-19 vaccine hesitancy. Available at SSRN 3667971, Article ID.

Calonge, D. S., Aguerrebere, P. M., Hultberg, P. and Connor, M. 2021. Were Higher Education Institutions Communication Strategies Well Suited for the COVID-19 Pandemic? *Journal of Education and Learning*, 10 (4).

Campos-Mercade, P., Meier, A. N., Schneider, F. H., Meier, S., Pope, D. and Wengström, E. 2021. Monetary incentives increase COVID-19 vaccinations. *Science*, 374 (6569): 879-882.

Cañares, M. and van Schalkwyk, F. 2022. Making Higher Education Truly Inclusive. Article ID.

Carnegie, G. D., Guthrie, J. and Martin-Sardesai, A. 2021. Public universities and impacts of COVID-19 in Australia: risk disclosures and organisational change. *Accounting, Auditing & Accountability Journal*, Article ID.

CDC. 2022. Diseases You Almost Forgot About. Available: <https://www.cdc.gov/vaccines/parents/diseases/forgot-14-diseases.html> (Accessed 13 December 2022).

Ceron, W., de-Lima-Santos, M.-F. and Quiles, M. G. 2021. Fake news agenda in the era of COVID-19: Identifying trends through fact-checking content. *Online Social Networks and Media*, 21: 100116.

Chang, S. J., Choi, S., Kim, S.-A. and Song, M. 2014. Intervention strategies based on information-motivation-behavioral skills model for health behavior change: a systematic review. *Asian Nursing Research*, 8 (3): 172-181.

Checkoway, B. 2018. Inside the Gates: First-Generation Students Finding Their Way. *Higher Education Studies*, 8 (3): 72-84.

Cheng, F. K. 2022. Debate on mandatory COVID-19 vaccination. *Ethics, Medicine and Public Health*, 21: 100761.

Chesser, A., Drassen Ham, A. and Keene Woods, N. 2020. Assessment of COVID-19 knowledge among university students: implications for future risk communication strategies. *Health Education & Behavior*, 47 (4): 540-543.

Chetty, K. 2021. The case of South Africa: The societal impact of COVID-19. *The International Journal of Social Quality*, 11 (1-2): 85-110.

Chirico, F. and Teixeira da Silva, J. A. 2023. Evidence-based policies in public health to address COVID-19 vaccine hesitancy. *Future Virology*, 18 (4): 261-273.

- Chisita, C. T. and Chizoma, U. S. 2021. Rethinking academic library space amidst the COVID-19 pandemic in South Africa: preparing for the future. *Information Discovery and Delivery*, Article ID.
- Chitungo, I., Mhango, M., Mbunge, E., Dzobo, M. and Dzinamarira, T. 2021. Digital technologies and COVID-19: Reconsidering lockdown exit strategies for Africa. *Pan African Medical Journal*, 39 (1).
- Chou, W.-Y. S. and Budenz, A. 2020. Considering emotion in COVID-19 vaccine communication: addressing vaccine hesitancy and fostering vaccine confidence. *Health Communication*, 35 (14): 1718-1722.
- Christian, M., Purwanto, E. and Wibowo, S. 2020. Technostress creators on teaching performance of private universities in Jakarta during Covid-19 pandemic. *Technology Reports of Kansai University*, 62 (6): 2799-2809.
- Chu, H. and Liu, S. 2021. Integrating health behavior theories to predict American's intention to receive a COVID-19 vaccine. *Patient Education and Counseling*, 104 (8): 1878-1886.
- Chuene, T. A. and Kgarose, M. F. 2023. Zooming in the Determinants of Sexually Transmitted Infections Amongst Students at Institution of Higher Learning in South Africa. *Gender and Behaviour*, 21 (3): 21922-21932.
- Clark, V., Cresswell, J., Gutmann, M. and Hanson, W. 2003. Advanced mixed-methods research design. *Handbook of Mixed Methods in Social & Behavioral Research*, Sage Publications, Thousand Oaks, Article ID.
- Clement, K. D., Zimmermann, E. F., Bhatt, N. R., Light, A., Gao, C., Kulkarni, M., Norris, J. M., Gallagher, K. M., Cambridge, W. A. and Shah, T. T. 2020. Communication tools in the COVID-19 era and beyond which can optimise professional practice and patient care. *BMJ Innovations*, Article ID: bmjinnov-2020-000465.
- Coakes, S. J. 2007. *Analysis without anguish: Version 12.0 for Windows*. John Wiley & Sons, Inc.
- Cohen, A. F., van Gerven, J., Burgos, J. G., de Boer, A., Foucher, R. A., Flore, H., Teitelbaum, Z., van Eden, W., Webb, A. and Cremers, S. 2020. COVID-19 vaccines: the importance of transparency and fact-based education. *British Journal of Clinical Pharmacology*, 86 (11): 2107.
- Coltart, C. E., Lindsey, B., Ghinai, I., Johnson, A. M. and Heymann, D. L. 2017. The Ebola outbreak, 2013–2016: old lessons for new epidemics. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 372 (1721): 20160297.
- Connors, G. J., DiClemente, C. C., Velasquez, M. M. and Donovan, D. M. 2013. *Substance abuse treatment and the stages of change: Selecting and planning interventions*. Guilford Press.
- Coombs, W. T. 2015. The value of communication during a crisis: Insights from strategic communication research. *Business Horizons*, 58 (2): 141-148.
- Cooper, S., van Rooyen, H. and Wiysonge, C. S. 2021. COVID-19 vaccine hesitancy in South Africa: how can we maximize uptake of COVID-19 vaccines? *Expert Review of Vaccines*, Article ID: 1-13.

Cooper, T. J., Woodward, B., Alom, S. and Harky, A. 2020. Coronavirus disease 2019 (COVID-19) outcomes in HIV/AIDS patients: a systematic review. *HIV Medicine*, 21 (9): 567-577.

Copeland, W. E., McGinnis, E., Bai, Y., Adams, Z., Nardone, H., Devadanam, V., Rettew, J. and Hudziak, J. J. 2021. Impact of COVID-19 pandemic on college student mental health and wellness. *Journal of the American Academy of Child & Adolescent Psychiatry*, 60 (1): 134-141. e132.

Costa, K. 2020. The cause of panic at the outbreak of COVID-19 in South Africa—a comparative analysis with similar outbreak in China and New York. Available at SSRN 3613597, Article ID.

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P. and Lam, S. 2020. COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 3 (1): 1-20.

Crawshaw, A. F., Farah, Y., Deal, A., Rustage, K., Hayward, S. E., Carter, J., Knights, F., Goldsmith, L. P., Campos-Matos, I. and Wurie, F. 2022. Defining the determinants of vaccine uptake and undervaccination in migrant populations in Europe to improve routine and COVID-19 vaccine uptake: a systematic review. *The Lancet Infectious Diseases*, Article ID.

Creswell, J., Clark, V., Gutmann, M. and Hanson, W. 2003. Handbook of Mixed Methods in Social & Behavioral Research. A. Tashakkori ve C. Teddlie (Ed.). Advanced Mixed Methods Research Designs (s. 223-227): Thousand Oaks, London: Sage Publications.

Creswell, J. W. and Clark, V. L. P. 2017. Designing and Conducting Mixed Methods Research. Sage publications.

Creswell, J. W. and Poth, C. N. 2016. Qualitative Inquiry and Research Design: Choosing among five approaches. Sage publications.

Cuan-Baltazar, J. Y., Muñoz-Perez, M. J., Robledo-Vega, C., Pérez-Zepeda, M. F. and Soto-Vega, E. 2020. Misinformation of COVID-19 on the internet: infodemiology study. *JMIR Public Health and Surveillance*, 6 (2): e18444.

Cuaton, G. P. 2020. Philippines higher education institutions in the time of COVID-19 pandemic. *Revista Românească pentru Educație Multidimensională*, 12 (1 Sup2): 61-70.

Cuello-Garcia, C., Pérez-Gaxiola, G. and van Amelsvoort, L. 2020. Social media can have an impact on how we manage and investigate the COVID-19 pandemic. *Journal of Clinical Epidemiology*, 127: 198-201.

Dadipoor, S., Ghaffari, M. and Safari-Moradabadi, A. 2020. University students and AIDS: a systematic review of knowledge, attitudes towards AIDS in Iran. *International Journal of Adolescence and Youth*, 25 (1): 861-871.

Daily Maverick. 2022. National State of Disaster ends after 750 days, but some regulations remain. Available: <https://www.dailymaverick.co.za/article/2022-04-04-national-state-of-disaster-ends-after-750-days-but-some-regulations-remain/> (Accessed 21 November 2022).

Davies, M.-A. 2020. HIV and risk of COVID-19 death: a population cohort study from the Western Cape Province, South Africa. *MedRxiv*, Article ID.

de Freitas, P. P., de Menezes, M. C., Dos Santos, L. C., Pimenta, A. M., Ferreira, A. V. M. and Lopes, A. C. S. 2020. The transtheoretical model is an effective weight management intervention: a randomized controlled trial. *BMC Public Health*, 20 (1): 1-12.

Department of Higher Education and Training. 2020. Your Guide to Level 2 in the Post-school Education and Training System. Available: <https://www.dhet.gov.za/SiteAssets/Media%20Statement%202020/> (Accessed 29 December 2023).

Department of Higher Education and Training. 2022. University Education Branch. Available: <https://www.dhet.gov.za/SitePages/UniversityEducation.aspx> (Accessed 06 December 2022).

Dominion Dominic, E. 2023. Linkages among Ontology, Epistemology, Methodology and Method in Research. Linkages among Ontology, Epistemology, Methodology and Method in Research (July 12, 2023), Article ID.

Dror, A. A., Eisenbach, N., Taiber, S., Morozov, N. G., Mizrahi, M., Zigran, A., Srouji, S. and Sela, E. 2020. Vaccine hesitancy: the next challenge in the fight against COVID-19. *European Journal of Epidemiology*, 35 (8): 775-779.

du Plessis, E., van Niekerk, D., Rosenkranz, B. and Preiser, W. 2022. After the COVID-19 state of disaster in South Africa. *Nature Human Behaviour*, 6 (7): 901-901.

Dubé, E., Vivion, M. and MacDonald, N. E. 2015. Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: influence, impact and implications. *Expert Review of Vaccines*, 14 (1): 99-117.

Dube, K. 2022. COVID-19 vaccine-induced recovery and the implications of vaccine apartheid on the global tourism industry. *Physics and Chemistry of the Earth, Parts A/B/C*, 126: 103140.

Dunn-Coetzee, M., Sinclair, E., Lyner-Cleophas, M., Brink, J., Timmey, M. and Davids, C. 2021. Adaptation of Student Support Services Considering Covid-19: Adjustments, Impact, and Future Implications. *Journal of Student Affairs in Africa*, 9 (1): 157-166.

Durban University of Technology. 2018. Durban University of Technology Annual Report 2018. Durban University of Technology. Available: <https://www.dut.ac.za/wp-content/uploads/2012/06/DUT-2018-Annual-Report.pdf> (Accessed 30 January 2024).

Durban University of Technology. 2020a. ENVISION 2030. Available: <https://www.dut.ac.za/wp-content/uploads/2020/03/Envision-2030-strategy-map.pdf> (Accessed 15 June 2022).

Durban University of Technology. 2020b. HealthCheck Communique. Available: <https://www.dut.ac.za/wp-content/uploads/2020/05/HealthCheck-Communique-Thursday-28-May-2020.pdf> (Accessed 16 July 2024).

Durban University of Technology. 2021a. About DUT. Available: <https://www.dut.ac.za/about-dut/> (Accessed 11 July 2021).

Durban University of Technology. 2021b. DUT COVID-19 VACCINATION CENTRE OFF TO A GOOD START. Available: <https://www.dut.ac.za/dut-covid-19-vaccination-centre-off-to-a-good-start/> (Accessed

Durban University of Technology. 2021c. DUT STATEMENT: COUNCIL DECISION ON POLICY CHOICES REGARDING THE VACCINATION OF STAFF AND STUDENTS.

Available: <https://www.dut.ac.za/dut-statement-council-decision-on-policy-choices-regarding-the-vaccination-of-staff-and-students/> (Accessed 28 June 2024).

Durban University of Technology. 2021d. DUT SUCCESSFULLY LAUNCHED ITS VACCINATION CENTRE AT THE MIDLANDS CAMPUS. Available: <https://www.dut.ac.za/dut-successfully-launched-its-vaccination-centre-at-the-midlands-campus/> (Accessed 14 September 2024).

Durban University of Technology. 2022a. DUT EMBARKS ON A MAJOR TWO-WEEK DAILY VACCINATION CAMPAIGN. Available: <https://www.dut.ac.za/dut-embarks-on-a-major-two-week-daily-vaccination-campaign/> (Accessed 14 September 2024).

Durban University of Technology. 2022b. University Statement - DUT launch it vaccination centre. Available: <https://www.dut.ac.za/wp-content/uploads/2022/01/DUT.Announcement.Communique-VaccinationCentre.27022285.pdf> (Accessed 14 September 2024).

Dzinamarira, T., Nachipo, B., Phiri, B. and Musuka, G. 2021. COVID-19 Vaccine Roll-Out in South Africa and Zimbabwe: Urgent Need to Address Community Preparedness, Fears and Hesitancy. *Vaccine*, 9 (3): 250.

Dzwigol, H. 2020. Methodological and empirical platform of triangulation in strategic management. *Academy of Strategic Management Journal*, 19 (4): 1-8.

Eaton, L. 2021. Covid-19: WHO warns against “vaccine nationalism” or face further virus mutations: British Medical Journal Publishing Group.

Eche, M. T. and Vermaak, K. 2022. Knowledge, attitude and practice of female university students regarding human papillomavirus and self-sampling in KwaZulu-Natal, South Africa: a cross-sectional survey. *BMC Women's Health*, 22 (1): 58.

Edholm, C. J., Levy, B., Spence, L., Agosto, F. B., Chirove, F., Chukwu, C. W., Goldsman, D., Kgosimore, M., Maposa, I. and White, K. J. 2022. A vaccination model for COVID-19 in Gauteng, South Africa. *Infectious Disease Modelling*, 7 (3): 333-345.

El Masri, A. and Sabzalieva, E. 2020. Dealing with disruption, rethinking recovery: Policy responses to the COVID-19 pandemic in higher education. *Policy Design and Practice*, 3 (3): 312-333.

Elhajjar, S. and Yacoub, L. 2022. The impact of COVID-19 on marketing for higher education institutions in developing countries: the case of Lebanon. *Journal of Marketing for Higher Education*, Article ID: 1-20.

Emadzadeh, M. and Vakili, V. 2020. Steps toward community health promotion: Application of transtheoretical model to predict stage transition regarding smoking. *Journal of Education and Health Promotion*, 9.

Enaifoghe, A., Dlelana, M., Durokifa, A. A. and Dlamini, N. P. 2021. The prevalence of gender-based violence against women in South Africa: A call for action. *African Journal of Gender, Society & Development*, 10 (1): 117.

Engelbrecht, M., Heunis, C. and Kigozi, G. 2022. COVID-19 vaccine hesitancy in South Africa: lessons for future pandemics. *International Journal of Environmental Research and Public Health*, 19 (11): 6694.

- Erdem, B. 2022. Fighting Infodemic Becomes Must After Covid-19 Pandemic's Onslaught on Truth, Knowledge. *European Journal of Natural Sciences and Medicine*, 5 (2): 114-128.
- Etikan, I., Musa, S. A. and Alkassim, R. S. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5 (1): 1-4.
- Evans, W. D., Bingenheimer, J. B., Long, M., Ndiaye, K., Donati, D., Rao, N. M., Akaba, S., Nsofor, I. and Agha, S. 2023. Outcomes of a social media campaign to promote COVID-19 vaccination in Nigeria. *Plos One*, 18 (9): e0290757.
- EWN. 2022. 750 DAYS LATER, SA NO LONGER UNDER NATIONAL STATE OF DISASTER. Available: <https://ewn.co.za/2022/04/05/750-days-later-sa-no-longer-under-state-of-disaster> (Accessed 21 November 2022).
- Fagbadebo, O. and Dorasamy, N. 2022. Pandemic Within Pandemic: Corruption as an Impediment to Effective Management of COVID-19 in Nigeria and South Africa. In: *Governance Challenges During the COVID-19 Pandemic in Africa*. Springer, 253-271.
- Fallon, E. A., Hausenblas, H. A. and Nigg, C. R. 2005. The transtheoretical model and exercise adherence: examining construct associations in later stages of change. *Psychology of Sport and Exercise*, 6 (6): 629-641.
- Farinloye, T., Wayne, T., Mogaji, E. and Watat, J. K. 2020. Social media for universities' strategic communication. In: *Strategic Marketing of Higher Education in Africa*. Routledge, 96-115.
- Favero, N., Jilke, S., Wolfson, J. A., Xu, C. and Young, M. M. 2021. Messenger effects in COVID-19 communication: Does the level of government matter? *Health Policy OPEN*, 2: 100027.
- Fenitra, R. M., Abbas, A., Ekowati, D. and Suhairidi, F. 2022. Strategic Intent and Strategic Leadership: A Review Perspective for Post-COVID-19 Tourism and Hospitality Industry Recovery. *The Emerald Handbook of Destination Recovery in Tourism and Hospitality*, Article ID: 23-44.
- Ferreira, G. B. and Borges, S. 2020. Media and misinformation in times of COVID-19: How people informed themselves in the days following the Portuguese declaration of the state of emergency. *Journalism and Media*, 1 (1): 108-121.
- Field, A. and Miles, J. 2010. *Discovering statistics using SAS*. Sage.
- Finset, A., Bosworth, H., Butow, P., Gulbrandsen, P., Hulsman, R. L., Pieterse, A. H., Street, R., Tschoetschel, R. and van Weert, J. 2020. Effective health communication—a key factor in fighting the COVID-19 pandemic. *Patient Education and Counseling*, 103 (5): 873.
- Fisher, J. D. and Fisher, W. A. 1992. Changing AIDS-risk behavior. *Psychological Bulletin*, 111 (3): 455.
- Fisher, J. D. and Fisher, W. A. 2023. An Information-Motivation-Behavioral Skills (IMB) model of pandemic risk and prevention. Article ID.
- Fisher, W. A., Fisher, J. D. and Harman, J. 2003. The information-motivation-behavioral skills model: A general social psychological approach to understanding and promoting health behavior. *Social Psychological Foundations of Health and Illness*, Article ID: 82-106.

- Fisher, W. A., Fisher, J. D. and Shuper, P. A. 2014. Social psychology and the fight against AIDS: An information–Motivation–Behavioral skills model for the prediction and promotion of health behavior change. In: *Advances in Experimental Social Psychology*. Elsevier, 105-193.
- Flannelly, L. T., Flannelly, K. J. and Jankowski, K. R. 2014. Independent, dependent, and other variables in healthcare and chaplaincy research. *Journal of Health Care Chaplaincy*, 20 (4): 161-170.
- Franco, J. V. A. 2021. Should COVID-19 vaccination be mandatory?: Royal Society of Medicine. Available: <https://ebm.bmj.com/content/26/6/269.abstract> (Accessed 25 September 2024).
- French, J., Deshpande, S., Evans, W. and Obregon, R. 2020. Key guidelines in developing a pre-emptive COVID-19 vaccination uptake promotion strategy. *International Journal of Environmental Research and Public Health*, 17 (16): 5893.
- Fusch, P. I. and Ness, L. R. 2015. Are we there yet? Data saturation in qualitative research. *The Qualitative Report*, 20 (9): 1408.
- Galvin, R. 2015. How many interviews are enough? Do qualitative interviews in building energy consumption research produce reliable knowledge? *Journal of Building Engineering*, 1: 2-12.
- Gatechompol, S., Avihingsanon, A., Putcharoen, O., Ruxrungtham, K. and Kuritzkes, D. R. 2021. COVID-19 and HIV infection co-pandemics and their impact: a review of the literature. *AIDS Research and Therapy*, 18 (1): 28.
- Gavi. 2023. Vaccine hesitancy in South Africa: COVID experience highlights conspiracies, mistrust and the role of the media. Available: <https://www.gavi.org/vaccineswork/vaccine-hesitancy-south-africa-covid-experience-highlights-conspiracies-mistrust> (Accessed 04 September 2024).
- George, G., Strauss, M., Lansdell, E., Nadesan-Reddy, N., Moroe, N., Reddy, T., Eshun-Wilsonova, I. and Moshabela, M. 2022. South African University Staff and Students' Perspectives, Preferences, and Drivers of Hesitancy Regarding COVID-19 Vaccines: A Multi-Methods Study. *Vaccine*, 10 (8): 1250.
- Giandhari, J., Pillay, S., Wilkinson, E., Tegally, H., Sinayskiy, I., Schuld, M., Lourenço, J., Chimukangara, B., Lessells, R. and Moosa, Y. 2021. Early transmission of SARS-CoV-2 in South Africa: An epidemiological and phylogenetic report. *International Journal of Infectious Diseases*, 103: 234-241.
- Gill, J., Johnson, P. and Clark, M. 2010. *Research Methods for Managers*. SAGE Publications.
- Glasdam, S. and Stjernswärd, S. 2020. Information about the COVID-19 pandemic–A thematic analysis of different ways of perceiving true and untrue information. *Social Sciences & Humanities Open*, 2 (1): 100090.
- Glasgow, G. 2005. Stratified sampling types. Article ID.
- Gobind, J. and Ukpere, W. I. 2015. Effectiveness of HIV/AIDS voluntary counselling and testing at a university in South Africa. *Corporate Ownership & Control*, Article ID: 522.
- Goldstein, S., MacDonald, N. E. and Guirguis, S. 2015. Health communication and vaccine hesitancy. *Vaccine*, 33 (34): 4212-4214.

Gonzalo, J. D., Heist, B. S., Duffy, B. L., Dyrbye, L., Fagan, M. J., Ferencick, G., Harrell, H., Hemmer, P. A., Kernan, W. N. and Kogan, J. R. 2013. The art of bedside rounds: a multi-center qualitative study of strategies used by experienced bedside teachers. *Journal of General Internal Medicine*, 28: 412-420.

Gostin, L. O., Salmon, D. A. and Larson, H. J. 2021. Mandating COVID-19 vaccines. *Jama*, 325 (6): 532-533.

Government Communications. 2020. Minister Blade Nzimande: Progress in implementation of Coronavirus Covid-19 measures by Post School Education and Training Sector. Available: <https://www.gov.za/news/speeches/minister-blade-nzimande-progress-implementation-coronavirus-covid-19-measures-post> (Accessed 10 January 2024).

Government of South Africa. 2024. Education. Available: <https://www.gov.za/about-sa/education> (Accessed 10 January 2024).

Grant, C. and Osanloo, A. 2014. Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your “house”. *Administrative Issues Journal*, 4 (2): 4.

Grant, F. K. E., Ackatia-Armah, R., Okuku, H. S. and Kakuhenzire, R. 2022. Association Between Nutrition Social Behavior Change Communication and Improved Caregiver Health and Nutrition Knowledge and Practices in Rural Tanzania. *Frontiers in Public Health*, 10: 736666.

Green, C. A., Duan, N., Gibbons, R. D., Hoagwood, K. E., Palinkas, L. A. and Wisdom, J. P. 2015. Approaches to mixed methods dissemination and implementation research: methods, strengths, caveats, and opportunities. *Administration and Policy in Mental Health and Mental Health Services Research*, 42 (5): 508-523.

Green, W., Anderson, V., Tait, K. and Tran, L. T. 2020. Precarity, fear and hope: Reflecting and imagining in higher education during a global pandemic: Taylor & Francis. Available: <https://www.tandfonline.com/doi/pdf/10.1080/07294360.2020.1826029?needAccess=true> (Accessed 11 July 2021).

Gresse, A., Steenkamp, L. and Pietersen, J. 2015. Eating, drinking and physical activity in Faculty of Health Science students compared to other students at a South African university. *South African Journal of Clinical Nutrition*, 28 (4): 154-159.

Griswold, A. R., Klein, J., Dusaj, N., Zhu, J., Keeler, A., Abramson, E. L. and Gurvitch, D. 2022. Students as community vaccinators: implementation of a service-learning COVID-19 vaccination program. *Vaccine*, 10 (7): 1058.

Grooms, A. A. and Childs, J. 2021. “We need to do better by kids”: Changing routines in US schools in response to COVID-19 school closures. *Journal of Education for Students Placed at Risk (JESPAR)*, 26 (2): 135-156.

Guest, G., Namey, E. and Chen, M. 2020. A simple method to assess and report thematic saturation in qualitative research. *PLoS One*, 15 (5): e0232076.

Guetterman, T. C., Feters, M. D. and Creswell, J. W. 2015. Integrating quantitative and qualitative results in health science mixed methods research through joint displays. *The Annals of Family Medicine*, 13 (6): 554-561.

- Gur-Arie, R., Jamrozik, E. and Kingori, P. 2021a. No jab, no job? Ethical issues in mandatory COVID-19 vaccination of healthcare personnel. *BMJ Global Health*, 6 (2): e004877.
- Gur-Arie, R., Jamrozik, E. and Kingori, P. 2021b. No jab, no job? Ethical issues in mandatory COVID-19 vaccination of healthcare personnel. *BMJ Global Health*, 6 (2).
- Gustafsson, M. and Deliwe, C. 2020. How is the COVID-19 pandemic affecting educational quality in South Africa. Evidence to date and future risks. Department of Economics, University of Stellenbosch, Article ID.
- Haffejee, F., Maughan-Brown, B., Buthelezi, T. and Kharsany, A. B. 2018. Perceived HIV-related stigma among university students in South Africa: implications for HIV testing. *African Journal of AIDS Research*, 17 (2): 109-118.
- Halaweh, M. 2020. Are Universities Using the Right Assessment Tools During the Pandemic and Crisis Times? *Higher Learning Research Communications*, 11: 1-9.
- Hamdan, M. B., Singh, S., Polavarapu, M., Jordan, T. R. and Melhem, N. 2021. COVID-19 vaccine hesitancy among university students in Lebanon. *Epidemiology & Infection*, 149: e242.
- Hansen, R.-K., Baiju, N. and Gabarron, E. 2023. Social media as an effective provider of quality-assured and accurate information to increase vaccine rates: systematic review. *Journal of Medical Internet Research*, 25: e50276.
- Haroun, D., El Saleh, O., Wood, L., Mechli, R., Al Marzouqi, N. and Anouti, S. 2016. Assessing knowledge of, and attitudes to, HIV/AIDS among university students in the United Arab Emirates. *PloS One*, 11 (2): e0149920.
- Harrell, P. T., Trezn, R., Scherer, M., Martins, S. and Latimer, W. 2013. A latent class approach to treatment readiness corresponds to a transtheoretical ("Stages of Change") model. *Journal of Substance Abuse Treatment*, 45 (3): 249-256.
- Hashemzadeh, M., Rahimi, A., Zare-Farashbandi, F., Alavi-Naeini, A. M. and Daei, A. 2019. Transtheoretical model of health behavioral change: A systematic review. *Iranian Journal of Nursing and Midwifery Research*, 24 (2): 83.
- Hashim, K. F., Rashid, A. and Atalla, S. 2018. Social Media for Teaching and Learning within Higher Education Institution: A Bibliometric Analysis of the Literature (2008-2018). *International Journal of Interactive Mobile Technologies*, 12 (7).
- Hayawi, K., Shahriar, S., Serhani, M. A., Alashwal, H. and Masud, M. M. 2021. Vaccine versus variants (3Vs): are the COVID-19 vaccines effective against the variants? A systematic review. *Vaccine*, 9 (11): 1305.
- Heale, R. and Forbes, D. 2013. Understanding triangulation in research. *Evidence-based Nursing*, 16 (4): 98-98.
- Heale, R. and Twycross, A. 2015. Validity and reliability in quantitative studies. *Evidence-based Nursing*, 18 (3): 66-67.
- Hernández-García, I. and Giménez-Júlvez, T. 2020. Assessment of health information about COVID-19 prevention on the internet: infodemiological study. *JMIR Public Health and Surveillance*, 6 (2): e18717.

- Hickler, B., Guirguis, S. and Obregon, R. 2015. Vaccine special issue on vaccine hesitancy. *Vaccine*, 34 (33): 4155-4156.
- Hines, K. 2022. "Who Said What?": Effects of Message Framing and Source Type Toward COVID-19 Vaccinations Intentions among College Students. Article ID Auburn University. Available: <https://www.proquest.com/openview/2fd67aa0d8c2293785b7837e258c2c68/1?pq-origsite=gscholar&cbl=18750&diss=y> (Accessed 17 January 2024).
- Hlatshwayo, M. 2022. Online learning during the South African COVID-19 lockdown: University students left to their own devices. *Education as Change*, 26 (1): 1-23.
- Hobbs, R. 2020. *Mind over media: Propaganda education for a digital age*. WW Norton & Company.
- Horwath, C. C., Schembre, S. M., Motl, R. W., Dishman, R. K. and Nigg, C. R. 2013. Does the transtheoretical model of behavior change provide a useful basis for interventions to promote fruit and vegetable consumption? *American Journal of Health Promotion*, 27 (6): 351-357.
- Hossain, M. I., Ahmad, I., Mehedi, N., Akter, R. and Cane, T. P. C. 2022. Social stigma and vulnerabilities of HIV/AIDS-positive people: Reconsidering social work education and NGOs' role in Bangladesh. *Journal of HIV/AIDS & Social Services*, Article ID: 1-27.
- Hotez, P., Batista, C., Ergonul, O., Figueroa, J. P., Gilbert, S., Gursel, M., Hassanain, M., Kang, G., Kim, J. H. and Lall, B. 2021. Correcting COVID-19 vaccine misinformation: Lancet Commission on COVID-19 vaccines and therapeutics task force members. *EClinicalMedicine*, 33.
- Howard, P. N., Ganesh, B., Liotsiou, D., Kelly, J. and François, C. 2019. The IRA, social media and political polarization in the United States, 2012-2018. Article ID.
- Hume, J. and Leonard, A. 2014. Exploring the strategic potential of internal communication in international non-governmental organisations. *Public Relations Review*, 40 (2): 294-304.
- Hunziker, S. and Blankenagel, M. 2021. *Research Design in Business and Management*. Research Design in Business and Management, Article ID.
- Ifijeh, G. and Yusuf, F. 2020. Covid-19 pandemic and the future of Nigeria's university system: The quest for libraries' relevance. *The Journal of Academic Librarianship*, 46 (6): 102226.
- Impouma, B., Mboussou, F., Farham, B., Makubalo, L., Mwinga, K., Onyango, A., Sthreshley, L., Akpaka, K., Balde, T. and Atuhebwe, P. 2022. COVID-19 vaccination rollout in the World Health Organization African region: status at end June 2022 and way forward. *Epidemiology & Infection*, 150: e143.
- Inungu, J., Mumford, V., Younis, M. and Langford, S. 2009. HIV knowledge, attitudes and practices among college students in the United States. *Journal of Health and Human Services Administration*, 32 (3): 259-277.
- IOL. 2020. Coronavirus in SA: DUT announces early closure, cancels graduation. Available: <https://www.iol.co.za/mercury/news/coronavirus-in-sa-dut-announces-early-closure-cancels-graduation-44982630> (Accessed 31 August 2024).
- Jamshed, J. 2021. Lawyers response to COVID-19 infodemic on social media. *Library Philosophy and Practice*, Article ID: 1-14.

- Jankowska-Polańska, B., Sarzyńska, K., Czwojdzinski, E., Świątoniowska-Lonc, N., Dudek, K. and Piwowar, A. 2022. Attitude of health care workers and medical students towards vaccination against COVID-19. *Vaccine*, 10 (4): 535.
- Jennings, W., Stoker, G., Bunting, H., Valgarðsson, V. O., Gaskell, J., Devine, D., McKay, L. and Mills, M. C. 2021. Lack of trust, conspiracy beliefs, and social media use predict COVID-19 vaccine hesitancy. *Vaccine*, 9 (6): 593.
- Jili, N. N., Ede, C. I. and Masuku, M. M. 2021. Emergency remote teaching in higher education during COVID-19: challenges and opportunities. *International Journal of Higher Education*, 10 (5): 1-9.
- Jose, R., Narendran, M., Bindu, A., Beevi, N., Manju, L. and Benny, P. 2021. Public perception and preparedness for the pandemic COVID 19: a health belief model approach. *Clinical Epidemiology and Global Health*, 9: 41-46.
- Julious, S. A. 2005. Sample size of 12 per group rule of thumb for a pilot study. *Pharmaceutical Statistics: The Journal of Applied Statistics in the Pharmaceutical Industry*, 4 (4): 287-291.
- Kaiser, J. L., Hamer, D. H., Juntunen, A., Ngoma, T., Fink, G., Schueler, J., Rockers, P. C., Biemba, G. and Scott, N. A. 2023. COVID-19 Knowledge and Prevention Behaviors in Rural Zambia: A Qualitative Application of the Information-Motivation-Behavioral Skills Model. *The American Journal of Tropical Medicine and Hygiene*, 109 (1): 76.
- Kalipa, M. 2014. Experiences of students living with HIV/AIDS regarding the support group: A case of University of Fort Hare, Alice campus, South Africa. *African Journal for Physical Health Education, Recreation and Dance*, 20 (4): 1324-1341.
- Kalita, A. 2006. Maternal behaviour change for child health and nutrition. Social Initiatives Group, ICICI Bank: Mumbai (Forthcoming), Article ID.
- Kalu, A. O. U., Unachukwu, L. C. and Ibiam, O. 2019. Accessing secondary data: A literature review. Article ID.
- Kanyanda, S., Markhof, Y., Wollburg, P. and Zezza, A. 2021. Acceptance of COVID-19 vaccines in sub-Saharan Africa: evidence from six national phone surveys. *BMJ Open*, 11 (12): e055159.
- Kaplan, R. M. and Milstein, A. 2021. Influence of a COVID-19 vaccine's effectiveness and safety profile on vaccination acceptance. *Proceedings of the National Academy of Sciences*, 118 (10): e2021726118.
- Karafillakis, E. and Larson, H. J. 2017. The benefit of the doubt or doubts over benefits? A systematic literature review of perceived risks of vaccines in European populations. *Vaccine*, 35 (37): 4840-4850.
- Kartikawangi, D. and Dahesihsari, R. 2020. Organizational communication responses to Covid-19: Strategies and practices. *Jurnal Komunikasi Ikatan Sarjana Komunikasi Indonesia*, 5 (2): 189-198.
- Kaushik, V. and Walsh, C. A. 2019. Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, 8 (9): 255.

- Kheswa, J. and Hoho, V. 2017. Exploring the factors and effects of alcohol abuse on the behaviour of university female students at one South African University Campus. *Rupkatha J Interdiscip Stud Humanit*, 9 (1): 10.21659.
- Kim, D. K. D. and Kreps, G. L. 2020. An analysis of government communication in the United States during the COVID-19 pandemic: recommendations for effective government health risk communication. *World Medical & Health Policy*, 12 (4): 398-412.
- Kim, T. K. 2015. T test as a parametric statistic. *Korean Journal of Anesthesiology*, 68 (6): 540-546.
- King, J., Ferraz, O. L. M. and Jones, A. 2022. Mandatory COVID-19 vaccination and human rights. *The Lancet*, 399 (10321): 220-222.
- Kite, J., Foley, B. C., Grunseit, A. C. and Freeman, B. 2016. Please like me: Facebook and public health communication. *PloS One*, 11 (9): e0162765.
- Kivunja, C. and Kuyini, A. B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6 (5): 26-41.
- Kobayashi, T., Tomoi, H., Nishina, Y., Harada, K., Tanaka, K., Sasaki, S., Inaba, K., Mitaka, H., Takahashi, H. and Passanante, A. 2023. Effect of a mobile app chatbot and an interactive small-group webinar on COVID-19 vaccine intention and confidence in Japan: a randomised controlled trial. *BMJ Global Health*, 8 (5): e010370.
- Kolata, G. 2001. Flu: The story of the great influenza pandemic of 1918 and the search for the virus that caused it. Simon and Schuster.
- Kon, Z. R. and Lackan, N. 2008. Ethnic disparities in access to care in post-apartheid South Africa. *American Journal of Public Health*, 98 (12): 2272-2277.
- Kornides, M. L., McRee, A.-L. and Gilkey, M. B. 2018. Parents who decline HPV vaccination: who later accepts and why? *Academic Pediatrics*, 18 (2): S37-S43.
- Kricorian, K., Civen, R. and Equils, O. 2022. COVID-19 vaccine hesitancy: Misinformation and perceptions of vaccine safety. *Human Vaccines & Immunotherapeutics*, 18 (1): 1950504.
- Krosnick, J. A. 2018. Improving question design to maximize reliability and validity. The Palgrave Handbook of Survey Research, Article ID: 95-101.
- Kruth, J. G. 2015. Five qualitative research approaches and their applications in parapsychology 1. *The Journal of Parapsychology*, 79 (2): 219.
- Lachlan, K. A., Spence, P. R., Lin, X., Najarian, K. and Del Greco, M. 2016. Social media and crisis management: CERC, search strategies, and Twitter content. *Computers in Human Behavior*, 54: 647-652.
- Lan, T. and Yang, Y. 2021. Determinants of Preventive Behaviors of COVID-19 in China: An Information-Motivation-Behavioral Skills Model. In: Proceedings of Proceedings of the Fifteenth International Conference on Management Science and Engineering Management: Volume 2 15. Springer, 88-108.
- Lancet, T. 2021. Access to COVID-19 vaccines: looking beyond COVAX. *Lancet* (London, England), 397 (10278): 941.

- Landa, N., Zhou, S. and Marongwe, N. 2021. Education in emergencies: Lessons from COVID-19 in South Africa. *International Review of Education*, 67 (1-2): 167-183.
- Larson, H. J., Cooper, L. Z., Eskola, J., Katz, S. L. and Ratzan, S. 2011. Addressing the vaccine confidence gap. *The Lancet*, 378 (9790): 526-535.
- Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M. and Paterson, P. 2014. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007–2012. *Vaccine*, 32 (19): 2150-2159.
- Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., Kimball, S. and El-Mohandes, A. 2021. A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine*, 27 (2): 225-228.
- Le Grange, L. 2021. Covid-19 pandemic and the prospects of education in South Africa. *Prospects*, 51 (1): 425-436.
- Ledford, C. J., Cafferty, L. A., Moore, J. X., Roberts, C., Whisenant, E. B., Garcia Rychtarikova, A. and Seehusen, D. A. 2022. The dynamics of trust and communication in COVID-19 vaccine decision making: A qualitative inquiry. *Journal of Health Communication*, 27 (1): 17-26.
- Lee, D., Rundle-Thiele, S., Wut, T. M. and Li, G. 2022. Increasing seasonal influenza vaccination among university students: a systematic review of programs using a social marketing perspective. *International Journal of Environmental Research and Public Health*, 19 (12): 7138.
- Lee, Y.-C., Lee, B.-H., Lin, Y.-H., Wu, B.-J., Chen, T.-J., Chen, W.-M. and Chen, Y.-C. 2024. Enhancing COVID-19 booster vaccination among the elderly through text message reminders. *Human Vaccines & Immunotherapeutics*, 20 (1): 2375665.
- Li, J.-B., Yang, A., Dou, K., Wang, L.-X., Zhang, M.-C. and Lin, X.-Q. 2020. Chinese public's knowledge, perceived severity, and perceived controllability of COVID-19 and their associations with emotional and behavioural reactions, social participation, and precautionary behaviour: A national survey. *BMC Public Health*, 20 (1): 1-14.
- Liliana, L., Baroiu, L., Ciubara, A. B., Anghel, R., ILIESCU, A. I. B., Anghel, L. and Ciubara, A. 2021. Covid-19 and the Spanish flu. From suffering to re-silience. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 11 (3Sup1): 01-07.
- Liu, C. H., Pinder-Amaker, S., Hahm, H. C. and Chen, J. A. 2022. Priorities for addressing the impact of the COVID-19 pandemic on college student mental health. *Journal of American College Health*, 70 (5): 1356-1358.
- Lohr, S. L. 2021. Sampling: design and analysis. CRC press.
- Loomba, S., de Figueiredo, A., Piatek, S. J., de Graaf, K. and Larson, H. J. 2021. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nature Human Behaviour*, 5 (3): 337-348.
- Lowe, N. K. 2019. What is a pilot study? *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 48 (2): 117-118.
- Ludden, G. D. S. and Hekkert, P. 2014. Design for healthy behavior: design interventions and stages of change. In: Proceedings of 9th International Conference on Design and Emotion.

482-488. Available: <https://core.ac.uk/download/pdf/211816489.pdf> (Accessed 29 January 2024).

Lwin, M. O., Lu, J., Sheldenkar, A. and Schulz, P. J. 2018. Strategic uses of Facebook in Zika outbreak communication: implications for the crisis and emergency risk communication model. *International Journal of Environmental Research and Public Health*, 15 (9): 1974.

Machado, B. A. S., Hodel, K. V. S., Fonseca, L. M. d. S., Pires, V. C., Mascarenhas, L. A. B., da Silva Andrade, L. P. C., Moret, M. A. and Badaró, R. 2022. The importance of vaccination in the context of the COVID-19 pandemic: a brief update regarding the use of vaccines. *Vaccine*, 10 (4): 591.

Madonsela, P. 2021. KZN school staff vaccine rollout: Mixed bag of feelings as teachers weigh up options. *HEALTH-E-NEWS*, 08 July 2021 Available: <https://health-e.org.za/2021/07/08/kzn-school-staff-vaccine-rollout-mixed-bag-of-feelings-as-teachers-weigh-up-options/> (Accessed 06 August 2021).

Mahabeer, P. 2021. "Powerless and afraid, I felt they let me down": Reflections of a first-year student on gender-based violence at a university in South Africa. *Agenda*, 35 (1): 29-41.

Mahase, E. 2020. China coronavirus: WHO declares international emergency as death toll exceeds 200. *BMJ: British Medical Journal (Online)*, 368.

Maheshwari, S., Singhal, V., Ravi, V., Shrivatsava, S. and Badarinath, K. 2018. Cost-effective and self-regulating digital Noticeboard systems. In: Proceedings of 2018 3rd International Conference on Computational Systems and Information Technology for Sustainable Solutions (CSITSS). IEEE, 240-246. 15 October 2024).

Mahmud, M. S., Rahman, M. M., Masud-UI-Hasan, M. and Islam, M. A. 2021. Does 'COVID-19 phobia' stimulate career anxiety?: Experience from a developing country. *Heliyon*, 7 (3): e06346.

Maimaiti, N., Shamsuddin, K., Abdurahim, A., Tohti, N. and Memet, R. 2010. Knowledge, attitude and practice regarding HIV/AIDS among university students in Xinjiang. *Global Journal of Health Science*, 2 (2): 51.

Makoni, M. 2020. COVID-19 vaccine trials in Africa. *The Lancet Respiratory Medicine*, 8 (11): e79-e80.

Malecki, K. M., Keating, J. A. and Safdar, N. 2021. Crisis communication and public perception of COVID-19 risk in the era of social media. *Clinical Infectious Diseases*, 72 (4): 697-702.

Malureanu, A., Panisoara, G. and Lazar, I. 2021. The relationship between self-confidence, self-efficacy, grit, usefulness, and ease of use of elearning platforms in corporate training during the COVID-19 pandemic. *Sustainability*, 13 (12): 6633.

Mansor, N., Ahmad, N. and Rahman, H. A. 2020. Determinants of knowledge on sexually transmitted infections among students in public higher education institutions in Melaka state, Malaysia. *Plos One*, 15 (10): e0240842.

Mant, M., Aslemand, A., Prine, A. and Jaagumägi Holland, A. 2021. University students' perspectives, planned uptake, and hesitancy regarding the COVID-19 vaccine: A multi-methods study. *PloS One*, 16 (8): e0255447.

- Mantel, C. and Cherian, T. 2020. New immunization strategies: adapting to global challenges. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz*, 63 (1): 25-31.
- Mantell, J. E., Smit, J. A., Exner, T. M., Mabude, Z., Hoffman, S., Beksinska, M., Kelvin, E. A., Ngoloyi, C., Leu, C.-S. and Stein, Z. A. 2015. Promoting female condom use among female university students in KwaZulu-Natal, South Africa: results of a randomized behavioral trial. *AIDS and Behavior*, 19: 1129-1140.
- Maphalala, M. C. and Ajani, O. A. 2023. The COVID-19 pandemic: Shifting from conventional classroom learning to online learning in South Africa's higher education. *International Journal of Innovative Technologies in Social Science*, Article ID(2 (38)).
- Maphumulo, W. T. and Bhengu, B. R. 2019. Challenges of quality improvement in the healthcare of South Africa post-apartheid: A critical review. *Curationis*, 42 (1): 1-9.
- Marinoni, G., Van't Land, H. and Jensen, T. 2020. The impact of Covid-19 on higher education around the world. IAU Global Survey Report, 23.
- Marongwe, N. and Garidzirai, R. 2021. Together but not together: Challenges of remote learning for students amid the COVID-19 pandemic in rural South African universities. *Research in Social Sciences and Technology*, 6 (3): 213-226.
- Marshall, B., Cardon, P., Poddar, A. and Fontenot, R. 2013. Does sample size matter in qualitative research?: A review of qualitative interviews in IS research. *Journal of Computer Information Systems*, 54 (1): 11-22.
- Mason, P., Augustyn, M. and Seakhoa-King, A. 2010. Exploratory study in tourism: Designing an initial, qualitative phase of sequenced, mixed methods research. *International Journal of Tourism Research*, 12 (5): 432-448.
- Mason, P., Rollnick, S. and Butler, C. C. 2010. Health Behavior Change E-book. Elsevier Health Sciences.
- Matarirano, O., Gqokonqana, O. and Yeboah, A. 2021. Students' responses to multi-modal emergency remote learning during COVID-19 in a South African Higher Institution. *Research in Social Sciences and Technology*, 6 (2): 199-218.
- Mdiniso, J., Shangase, Z. P., Nkwanyana, S., Cele, S. and Mkhasibe, R. G. 2022. Transition to emergency online learning in SA: Reflection of historically black universities. *African Journal of Development Studies*, 12 (1).
- Mdletshe, M. 2020. Destruction of 5G towers is criminal, warns KZN premier. *Timeslive* 15 January 2021 Available: <https://www.timeslive.co.za/news/south-africa/2021-01-15-destruction-of-5g-towers-is-criminal-warns-kzn-premier/> (Accessed 06 August 2021).
- Meng, L., Hua, F. and Bian, Z. 2020. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *Journal of Dental Research*, 99 (5): 481-487.
- Merkley, E. and Loewen, P. J. 2021. Assessment of communication strategies for mitigating COVID-19 vaccine-specific hesitancy in Canada. *JAMA Network Open*, 4 (9): e2126635-e2126635.
- Mezmir, E. A. 2020. Qualitative data analysis: An overview of data reduction, data display, and interpretation. *Research on Humanities and Social Sciences*, 10 (21): 15-27.

- Mheidly, N. and Fares, J. 2020a. Leveraging media and health communication strategies to overcome the COVID-19 infodemic. *Journal of Public Health Policy*, Article ID: 1-11.
- Mheidly, N. and Fares, J. 2020b. Leveraging media and health communication strategies to overcome the COVID-19 infodemic. *Journal of Public Health Policy*, 41 (4): 410-420.
- Mhlanga, D., Denhere, V. and Moloi, T. 2022. COVID-19 and the Key Digital Transformation Lessons for Higher Education Institutions in South Africa. *Education Sciences*, 12 (7): 464.
- Misovich, S. J., Martinez, T., Fisher, J. D., Bryan, A. and Catapano, N. 2003. Predicting Breast Self-Examination: A Test of the Information-Motivation-Behavioral Skills Model 1. *Journal of Applied Social Psychology*, 33 (4): 775-790.
- Mize, T. D. and Manago, B. 2022. The past, present, and future of experimental methods in the social sciences. *Social Science Research*, 108: 102799.
- Mkhize, S. P. and Maharaj, P. 2021. Meeting the sexual health needs of LGBT youth: Perceptions and experiences of university students in KwaZulu-Natal, South Africa. *Journal of Social Service Research*, 47 (1): 56-72.
- Mlozi, S. H. 2022. The role of natural products from medicinal plants against COVID-19: traditional medicine practice in Tanzania. *Heliyon*, 8 (6).
- Mncube, V., Mutongoza, B. H. and Olawale, E. 2021. Managing higher education institutions in the context of COVID-19 stringency: Experiences of stakeholders at a rural South African university. *Perspectives in Education*, 39 (1): 390-409.
- Moagi, M., Mulaudzi, M. and Van Der Wath, A. 2020. Support programs for students at higher education institutions in South Africa: an appreciative inquiry study on managing alcohol abuse. *Journal of Substance Use*, 25 (1): 107-112.
- Modi, B. H., Pretorius, D. and Francis, J. M. 2022. A study on willingness to take the COVID-19 vaccine at a tertiary institution community in Johannesburg, South Africa. *African Journal of Primary Health Care & Family Medicine*, 14 (1): 1-7.
- Moehring, A., Collis, A., Garimella, K., Rahimian, M. A., Aral, S. and Eckles, D. 2023. Providing normative information increases intentions to accept a COVID-19 vaccine. *Nature Communications*, 14.
- Mogaji, E. and Jain, V. 2020. Impact of the pandemic on higher education in emerging countries: emerging opportunities, challenges and research agenda. *Challenges and Research Agenda* (June 8, 2020), Article ID.
- Moges, N. A., Adesina, O. A., Okunlola, M. A. and Berhane, Y. 2020. Barriers and facilitators of same-day antiretroviral therapy initiation among people newly diagnosed with HIV in Ethiopia: qualitative study using the transtheoretical model of behavioral change. *Journal of Multidisciplinary Healthcare*, Article ID: 1801-1815.
- Mokgatle, M. M., Madiba, S. and Cele, L. 2021. A comparative analysis of risky sexual behaviors, self-reported sexually transmitted infections, knowledge of symptoms and partner notification practices among male and female university students in Pretoria, South Africa. *International Journal of Environmental Research and Public Health*, 18 (11): 5660.

Moore, R., Purvis, R. S., Hallgren, E., Willis, D. E., Hall, S., Reece, S., CarlLee, S., Judkins, H. and McElfish, P. A. 2022. Motivations to vaccinate among hesitant adopters of the COVID-19 vaccine. *Journal of Community Health*, Article ID: 1-9.

Moqaddas, A., Reisi, M., Mahmoodi, M. and Javadzade, H. 2023. Predictive factors of stages of change in Hookah smoking cessation among Iranian adults based on the transtheoretical model. *Addiction & Health*, 15 (2): 77.

Moreno, Á., Fuentes Lara, C. M. and Navarro, C. 2020. Covid-19 communication management in Spain: Exploring the effect of information-seeking behavior and message reception in public's evaluation. Article ID.

Morgan, D. L. 2014. Pragmatism as a paradigm for social research. *Qualitative Inquiry*, 20 (8): 1045-1053.

Morris, M., Roodt, M., Pretorius, H., Jeffery, A., Kane-Berman, J., Crouse, G., Corrigan, T., Gon, S., Mahlobo, B. and Babaya, N. 2020. 2 Clamart Road, Richmond Johannesburg, 2092 South Africa PO Box 291722, Melville, Johannesburg, 2109 South Africa Telephone:(011) 482-7221© South African Institute of Race Relations. Article ID.

Motsa, N. D. 2021. COVID-19: Understanding and responding to the educational implications for the vulnerable children of Eswatini. *Perspectives in Education*, 39 (3): 17-29.

Motta, M., Sylvester, S., Callaghan, T. and Lunz-Trujillo, K. 2021. Encouraging COVID-19 vaccine uptake through effective health communication. *Frontiers in Political Science*, 3: 630133.

Mthembu, Z., Maharaj, P. and Rademeyer, S. 2019. "I am aware of the risks, I am not changing my behaviour": risky sexual behaviour of university students in a high-HIV context. *African Journal of AIDS Research*, 18 (3): 244-253.

Mthethwa, C. 2021. Covid-19: 'There is no problem at all with the vaccine' - KZN Premier Sihle Zikalala after getting jab. *News24*, 28 July 2021 Available: <https://www.news24.com/news24/southafrica/news/covid-19-there-is-no-problem-at-all-with-the-vaccine-kzn-premier-sihle-zikalala-after-getting-jab-20210728> (Accessed 06 August 2021).

Mugari, I. and Obioha, E. E. 2021. African beliefs and citizens' disposition towards COVID-19 vaccines: The belief guided choices. *African Journal of Governance and Development*, 10 (1.1): 277-293.

Mukandavire, Z., Nyabadza, F., Malunguza, N. J., Cuadros, D. F., Shiri, T. and Musuka, G. 2020. Quantifying early COVID-19 outbreak transmission in South Africa and exploring vaccine efficacy scenarios. *PloS One*, 15 (7): e0236003.

Mulchandani, D., Alslaity, A. and Orji, R. 2023. Exploring the effectiveness of persuasive games for disease prevention and awareness and the impact of tailoring to the stages of change. *Human-Computer Interaction*, 38 (5-6): 459-494.

Mull, J. L. 2023. Retirement saving behavior: Transtheoretical Model change processes and life cycle tenets. Article ID. Available: <https://hdl.handle.net/2097/43520> (Accessed 29 January 2024).

Mulligan, K. and Harris, J. E. 2021. COVID-19 vaccination mandates for school and work are sound public policy. University of Southern California, Leonard D. Schaeffer Center for Health Policy & Economics, Article ID.

Murphy, J., Vallières, F., Bentall, R. P., Shevlin, M., McBride, O., Hartman, T. K., McKay, R., Bennett, K., Mason, L. and Gibson-Miller, J. 2021. Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. *Nature Communications*, 12 (1): 29.

Murwira, T. S., Khoza, L. B., Mabunda, J. T., Maputle, S. M., Mpeti, M. and Nunu, W. N. 2021. Knowledge of students regarding HIV/AIDS at a rural university in South Africa. *The Open AIDS Journal*, 15 (1): 42-51.

Musakwa, N., Nattey, C., Larshans, C., Andreasson, S., Evans, D., Nyasulu, P., Lönnemark, E., Long, L. and Bor, J. 2018. Knowledge, risk perception and access to healthcare services for HIV and tuberculosis among university students in Johannesburg, South Africa. *South African Journal of Child Health*, 2018 (1): s19-s31.

Museus, S. D. and Chang, T.-H. 2021. The impact of campus environments on sense of belonging for first-generation college students. *Journal of College Student Development*, 62 (3): 367-372.

Mustafa, N. 2020. Impact of the 2019–20 coronavirus pandemic on education. *International Journal of Health Preferences Research*, Article ID: 1-12.

Mutinta, G. 2022. Gender-based violence among female students and implications for health intervention programmes in public universities in Eastern Cape, South Africa. *Cogent Social Sciences*, 8 (1): 2079212.

Mutombo, P. N., Fallah, M. P., Munodawafa, D., Kabel, A., Houeto, D., Goronga, T., Mweemba, O., Balance, G., Onya, H. and Kamba, R. S. 2022. COVID-19 vaccine hesitancy in Africa: a call to action. *The Lancet Global Health*, 10 (3): e320-e321.

Mutombo, P. N., Kasilo, O. M. J., James, P. B., Wardle, J., Kunle, O., Katerere, D., Wambebe, C., Matsabisa, M. G., Rahmatullah, M. and Nikiema, J.-B. 2023. Experiences and challenges of African traditional medicine: lessons from COVID-19 pandemic. *BMJ Global Health*, 8 (8): e010813.

Mwangi, W. P., Koech, J., Anapapa, A. and Ingado, D. 2022. Chronic infections among university students: a review. *SAJSSE*, 14 (1): 30-45.

Mzangwa, S. T. 2019. Transformation as part of evolving organisational culture in the South African higher education institutions. *Cogent Social Sciences*, 5 (1): 1638635.

Nachega, J. B., Sam-Agudu, N. A., Masekela, R., van der Zalm, M. M., Nsanzimana, S., Condo, J., Ntoumi, F., Rabie, H., Kruger, M. and Wiysonge, C. S. 2021. Addressing challenges to rolling out COVID-19 vaccines in African countries. *The Lancet Global Health*, 9 (6): e746-e748.

Naidoo, P. and Cartwright, D. 2020. Where to from here? Contemplating the impact of COVID-19 on South African students and student counseling services in higher education. *Journal of College Student Psychotherapy*, Article ID: 1-15.

Naidoo, P. and Cartwright, D. J. 2018. Reflections on the history of South African Student Counseling Services: Achievements, challenges, and a way forward. *Journal of College Student Psychotherapy*, 32 (1): 23-41.

Namazi, M. and Namazi, N.-R. 2016. Conceptual analysis of moderator and mediator variables in business research. *Procedia Economics and Finance*, 36: 540-554.

Nancy, S. and Dongre, A. R. 2021. Behavior change communication: past, present, and future. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*, 46 (2): 186.

National Institute for Communicable Diseases. 2022. *Latest confirmed cases of covid-19 in South Africa (19 January 2022)*. Available: <https://www.nicd.ac.za/latest-confirmed-cases-of-covid-19-in-south-africa-19-january-2022/> (Accessed 23 August 2024).

NBC, N. 2020. *French doctor apologizes for comments on testing a COVID-19 vaccine in Africa, prompting outrage on social media*. Available: <https://www.nbcnews.com/news/nbcblk/french-doctor-apologizes-comments-testing-covid-19-vaccine-africa-prompting-n1177991> (Accessed 20 June 2023).

Nchabeleng, N. L. 2018. An analysis of communication tools employed for HIV/AIDS education by student support services at universities in KwaZulu-Natal. Doctor of Philosophy: Management Sciences (Public Management), Durban University of Technology. Available: <http://hdl.handle.net/10321/3142> (Accessed 09 July 2021).

Neves de Souza, A., Ferreira da Silva, S. T., Baptista dos Santos França, J., Fonseca da Silva Dias, A., Oliveira, J. and Vivacqua, A. S. 2023. Communication channels and their challenges: An analysis of software development teams during the COVID-19 pandemic. *Proceedings of the ACM on Human-Computer Interaction*, 7 (GROUP): 1-26.

News, R. P. 2021a. South Africa publishes pandemic plan for universities. Available: <https://researchprofessionalnews.com/rr-news-africa-south-2021-4-sa-publishes-pandemic-blueprint-for-universities/> (Accessed 10 July 2021).

NEWS, S. 2021b. *4 000 new HIV infections recorded daily, globally: Research*. Available: <https://www.sabcnews.com/sabcnews/4-000-new-hiv-infections-are-recorded-daily-globally-research/> (Accessed 20 June 2023).

Ngigi, S. and Busolo, D. N. 2018. Behaviour change communication in health promotion: Appropriate practices and promising approaches. *International Journal of Innovative Research and Development*, 7 (9): 84-93.

Ngulube, P., Mathipa, E. R. and Gumbo, M. T. 2015. Theoretical and conceptual frameworks in the social and management sciences. *Addressing research challenges: Making headway in developing researchers*, 2015: 43-66.

Nguyen, A. and Catalan-Matamoros, D. 2020. Digital mis/disinformation and public engagement with health and science controversies: Fresh perspectives from Covid-19. *Media and Communication*, 8 (2): 323-328.

Nkanjeni, U. 2021. 'Stop spreading fake news': KZN premier slams Covid-19 conspiracy theorists. *Timelive*, 04 January 2021 Available: <https://www.timeslive.co.za/news/2021-01-04-stop-spreading-fake-news-kzn-premier-slams-covid-19-conspiracy-theorists/> (Accessed 30 July 2021).

- Noar, S. M. and Austin, L. 2020. (Mis) communicating about COVID-19: Insights from health and crisis communication. *Health Communication*, 35 (14): 1735-1739.
- Noble, H. and Smith, J. 2015. Issues of validity and reliability in qualitative research. *Evidence-Based Nursing*, 18 (2): 34-35.
- Norton, W. E., Fisher, J. D., Amico, K. R., Dovidio, J. F. and Johnson, B. T. 2012. Relative efficacy of a pregnancy, sexually transmitted infection, or human immunodeficiency virus prevention-focused intervention on changing sexual risk behavior among young adults. *Journal of American College Health*, 60 (8): 574-582.
- Nubed, C. K. and Akoachere, J.-F. T. K. 2016. Knowledge, attitudes and practices regarding HIV/AIDS among senior secondary school students in Fako Division, South West Region, Cameroon. *BMC Public Health*, 16: 1-10.
- Nugraha, R. V., Ridwansyah, H., Ghozali, M., Khairani, A. F. and Atik, N. 2020. Traditional herbal medicine candidates as complementary treatments for COVID-19: A review of their mechanisms, pros and cons. *Evidence-Based Complementary and Alternative Medicine*, 2020 (1): 2560645.
- Nyandu, A. and Ross, E. 2020. Alcohol consumption among undergraduate social work students at a South African university. *Social Work Education*, 39 (4): 515-533.
- Ogude, N., Nel, H. and Oosthuizen, M. 2005. The challenge of curriculum responsiveness in South African higher education. *Council on Higher Education*, Article ID: 1-26.
- Oh, H. J. and Lee, H. 2019. When do people verify and share health rumors on social media? The effects of message importance, health anxiety, and health literacy. *Journal of Health Communication*, 24 (11): 837-847.
- Okesina, M. 2020. A critical review of the relationship between paradigm, methodology, design and method in research. *Journal of Research & Method in Education*, 10 (3): 57-68.
- Okoli, G. N., Racovitan, F., Abdulwahid, T., Hyder, S. K., Lansbury, L., Righolt, C. H., Mahmud, S. M. and Nguyen-Van-Tam, J. S. 2021. Decline in seasonal influenza vaccine effectiveness with vaccination program maturation: a systematic review and meta-analysis. In: *Proceedings of Open Forum Infectious Diseases*. Oxford University Press US, ofab069. Available: <https://doi.org/10.1093/ofid/ofab069> (Accessed 08 September 2024).
- Olaimat, A. N., Aolymat, I., Shahbaz, H. M. and Holley, R. A. 2020. Knowledge and information sources about COVID-19 among university students in Jordan: a cross-sectional study. *Frontiers in Public Health*, 8: 254.
- Olawale, B. E., Mutongoza, B. H., Adu, E. O. and Omodan, B. I. 2021. COVID-19 induced psychosocial challenges in South African higher education: Experiences of staff and students at two rural universities. *Research in Social Sciences and Technology*, 6 (3): 179-193.
- Olson, O., Berry, C. and Kumar, N. 2020. Addressing parental vaccine hesitancy towards childhood vaccines in the United States: a systematic literature review of communication interventions and strategies. *Vaccine*, 8 (4): 590.
- Opel, D. J., Diekema, D. S. and Ross, L. F. 2021. Should we mandate a COVID-19 vaccine for children? *JAMA Pediatrics*, 175 (2): 125-126.

- Osborn, C. Y. 2006. Using the IMB model of health behavior change to promote self-management behaviors in Puerto Ricans with diabetes. University of Connecticut.
- Osborn, C. Y., Amico, K. R., Cruz, N., O'Connell, A. A., Perez-Escamilla, R., Kalichman, S. C., Wolf, S. A. and Fisher, J. D. 2010. A brief culturally tailored intervention for Puerto Ricans with type 2 diabetes. *Health Education & Behavior*, 37 (6): 849-862.
- Oyo-lta, A., Bosch-Capblanch, X., Ross, A., Oku, A., Esu, E., Ameh, S., Oduwole, O., Arikpo, D. and Meremikwu, M. 2021. Effects of engaging communities in decision-making and action through traditional and religious leaders on vaccination coverage in Cross River State, Nigeria: A cluster-randomised control trial. *Plos One*, 16 (4): e0248236.
- Palm, R., Bolsen, T. and Kingsland, J. T. 2021. The effect of frames on COVID-19 vaccine resistance. *Frontiers in Political Science*, 3: 661257.
- Pandey, P. and Pandey, M. M. 2021. Research methodology tools and techniques. Bridge Center.
- Panyod, S., Ho, C.-T. and Sheen, L.-Y. 2020. Dietary therapy and herbal medicine for COVID-19 prevention: A review and perspective. *Journal of Traditional and Complementary Medicine*, 10 (4): 420-427.
- Papier, J. and Needham, S. 2022. Higher level vocational education in South Africa: Dilemmas of a differentiated system. In: *Equity and Access to High Skills through Higher Vocational Education*. Springer, 81-101.
- Paredes Ruvalcaba, N., Kim, A. W., Ndaba, N., Cele, L., Swana, S., Bosire, E. and Moolla, A. 2023. Coping mechanisms during the COVID-19 pandemic and lockdown in metropolitan Johannesburg, South Africa: A qualitative study. *American Journal of Human Biology*, 35 (12): e23958.
- Parker, P. D., Martin, A. J., Martinez, C., Marsh, H. W. and Jackson, S. A. 2010. Stages of change in physical activity: A validation study in late adolescence. *Health Education & Behavior*, 37 (3): 318-329.
- Patwary, M. M., Bardhan, M., Disha, A. S., Hasan, M., Haque, M., Sultana, R., Hossain, M., Browning, M. H., Alam, M. and Sallam, M. 2021. Determinants of COVID-19 vaccine acceptance among the adult population of Bangladesh using the health belief model and the theory of planned behavior model. *Vaccine*, 9 (12): 1393.
- Peng, Y., Pei, C., Zheng, Y., Wang, J., Zhang, K., Zheng, Z. and Zhu, P. 2020. Knowledge, attitude and practice associated with COVID-19 among university students: A cross-sectional survey in China. Article ID.
- Pengpid, S. and Peltzer, K. 2013. Physical inactivity and associated factors among university students in South Africa. *African Journal for Physical Health Education, Recreation and Dance*, 19 (1): 143-153.
- Pența, M. A. and Băban, A. 2018. Message framing in vaccine communication: a systematic review of published literature. *Health Communication*, 33 (3): 299-314.
- Persad, G. and Emanuel, E. J. 2021. Ethical considerations of offering benefits to COVID-19 vaccine recipients. *JAMA*, 326 (3): 221-222.

- Peters, M. D. 2022. Addressing vaccine hesitancy and resistance for COVID-19 vaccines. *International Journal of Nursing Studies*, 131: 104241.
- Petersen, M. B., Bor, A., Jørgensen, F. and Lindholt, M. F. 2021. Transparent communication about negative features of COVID-19 vaccines decreases acceptance but increases trust. *Proceedings of the National Academy of Sciences*, 118 (29): e2024597118.
- Petratos, P. N. 2021. Misinformation, disinformation, and fake news: Cyber risks to business. *Business Horizons*, 64 (6): 763-774.
- Phelan, A. L., Katz, R. and Gostin, L. O. 2020. The novel coronavirus originating in Wuhan, China: challenges for global health governance. *JAMA*, 323 (8): 709-710.
- Pokhrel, S. and Chhetri, R. 2021. A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, 8 (1): 133-141.
- Prochaska, J. O. and Velicer, W. F. 1997. The transtheoretical model of health behavior change. *American Journal of Health Promotion*, 12 (1): 38-48.
- Quadri, S., Kanji, M., Naing, N. and Huq, M. 2021. Transtheoretical Model of Behavioural Change. *International Journal of Pharmaceutical Research (09752366)*, 13 (2).
- Quinn, S. C., Hilyard, K. M., Jamison, A. M., An, J., Hancock, G. R., Musa, D. and Freimuth, V. S. 2017. The influence of social norms on flu vaccination among African American and White adults. *Health Education Research*, 32 (6): 473-486.
- Rahman, M. M., Tabash, M. I., Salamzadeh, A., Abduli, S. and Rahaman, M. S. 2022. Sampling techniques (probability) for quantitative social science researchers: a conceptual guidelines with examples. *Seeu Review*, 17 (1): 42-51.
- Raihan, N. and Cogburn, M. 2020. Stages of change theory. Available: <https://europepmc.org/article/nbk/nbk556005> (Accessed 29 January 2024).
- Rajasekar, S., Philominathan, P. and Chinnathambi, V. 2013. Research methodology. eprint. arXiv preprint physics/0601009, Article ID: 1-53.
- Rashid, S. and Yadav, S. S. 2020. Impact of Covid-19 pandemic on higher education and research. *Indian Journal of Human Development*, 14 (2): 340-343.
- Reddinger, J. L., Levine, D. and Charness, G. 2022. Can targeted messages reduce COVID-19 vaccination hesitancy? A randomized trial. *Preventive medicine reports*, 29: 101903.
- Reisdorf, B., Blank, G., Bauer, J. M., Cotten, S. R., Robertson, C. and Knittel, M. 2021. Information-seeking patterns and COVID-19 in the United States. *Journal of Quantitative Description: Digital Media*, 1: 1-38.
- Renner, B. and Schwarzer, R. 2003. Social-cognitive factors in health behavior change. *Social psychological foundations of health and illness*, Article ID: 169-196.
- Republic of South Africa. 2012. National Development Plan 2030: Our Future – make it work South Africa Available: [https://www.gov.za/sites/default/files/gcis\\_document/201409/ndp-2030-our-future-make-it-workr.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf) (Accessed 18 October 2023).
- Republic of South Africa, D. o. H. E. a. T. Training, H. E. 2021. Disaster Management Act (57/2002) » Directions on a national framework and criteria for the management of the 2021

Academic Year. 44342. South Africa Available: [https://www.greengazette.co.za/notices/disaster-management-act-57-2002-directions-on-a-national-framework-and-criteria-for-the-management-of-the-2021-academic-year\\_20210329-GGN-44342-00277.pdf](https://www.greengazette.co.za/notices/disaster-management-act-57-2002-directions-on-a-national-framework-and-criteria-for-the-management-of-the-2021-academic-year_20210329-GGN-44342-00277.pdf) (Accessed 10 July 2021).

Reuters. 2020. *South Africa to impose 21-day lockdown as coronavirus cases jump*. Available: <https://www.reuters.com/article/us-health-coronavirus-safrica-idUSKBN21A1SZ> (Accessed 20 September 2022).

Reveal, C. 2017. The Effects of Vaccinations on Public Health. *Bridges: A Journal of Student Research*, 11 (11): 4.

Riad, A., Pokorná, A., Antalová, N., Krobot, M., Zviadadze, N., Serdiuk, I., Koščík, M. and Klugar, M. 2021. Prevalence and drivers of COVID-19 vaccine hesitancy among Czech university students: National cross-sectional study. *Vaccine*, 9 (9): 948.

Rockliffe, L., Chorley, A. J., McBride, E., Waller, J. and Forster, A. S. 2018. Assessing the acceptability of incentivising HPV vaccination consent form return as a means of increasing uptake. *BMC Public Health*, 18: 1-9.

Rollnick, S., Miller, W. R., Butler, C. C. and Aloia, M. S. 2008. *Motivational interviewing in health care: helping patients change behavior*: Taylor & Francis.

Rosen, B., Waitzberg, R., Israeli, A., Hartal, M. and Davidovitch, N. 2021. Addressing vaccine hesitancy and access barriers to achieve persistent progress in Israel's COVID-19 vaccination program. *Israel Journal of Health Policy Research*, 10 (1): 43.

Rosental, H. and Shmueli, L. 2021. Integrating health behavior theories to predict COVID-19 vaccine acceptance: differences between medical students and nursing students. *Vaccines*, 9 (7): 783.

RSA. LAW, S. O. T. R. O. S. A.-C. 1996. CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA NO. 108 OF 1996 Available: <https://www.gov.za/sites/default/files/images/a108-96.pdf> (Accessed 18 June 2021).

Ruiz, A. A., Bezruki, A., Shinabargar, E., Large, K., Vieira, M., Slovenski, I., Liu, Y., Agarwal, S., Becker, A. and Moon, S. 2023. Which roads lead to access? A global landscape of six COVID-19 vaccine business models. Article ID.

Rwafa-Ponela, T., Price, J., Nyatela, A., Nqakala, S., Mosam, A., Erzse, A., Lalla-Edward, S. T., Hove, J., Kahn, K. and Tollman, S. 2022. "We Were Afraid": mental Health Effects of the COVID-19 pandemic in two south African Districts. *International Journal of Environmental Research and Public Health*, 19 (15): 9217.

Rzymiski, P., Borkowski, L., Drąg, M., Flisiak, R., Jemielity, J., Krajewski, J., Mastalerz-Migas, A., Matyja, A., Pyrc, K. and Simon, K. 2021. The strategies to support the COVID-19 vaccination with evidence-based communication and tackling misinformation. *Vaccines*, 9 (2): 109.

Saavedra-Alamillas, C., Pacheco-Mendoza, J., García-Meléndez, H. E., López, A. V., Martínez-Camacho, H., Ortiz-Díaz, E. M. and Ortega-Martínez, E. 2020. Document delivering services: a strategy to support research in Mexican universities in the pandemic by COVID-19. *Digital Library Perspectives*, Article ID: 337-349.

- Sabi, S. C., Unathi, K., Naidoo, D. and Siwela, M. 2021. Evaluation research on the food security programme effectiveness towards managing food insecurity at a South African university. *Journal of Consumer Sciences*, 2021 (6): 1-13.
- Sackey, E., Yandoh, J. and Sangban, K. 2023. Interactive Digital Notice Boards for Universities in Ghana. *African Journal of Applied Research*, 9 (1): 153-173.
- Sadaqat, W., Habib, S., Tauseef, A., Akhtar, S., Hayat, M., Shujaat, S. A., Mahmood, A. and Shujaat, S. A. 2021. Determination of COVID-19 vaccine hesitancy among university students. *Cureus*, 13 (8).
- Sahoo, A., Kumari, S., Barman, S., Patra, S. and Panda, R. 2022. VOICE CONTROL NOTICE BOARD. *Dogo Rangsang Research Journal* 12 (05): 599-603.
- Saied, S. M., Saied, E. M., Kabbash, I. A. and Abdo, S. A. E. F. 2021. Vaccine hesitancy: Beliefs and barriers associated with COVID-19 vaccination among Egyptian medical students. *Journal of Medical Virology*, 93 (7): 4280-4291.
- Salimi, N., Gere, B., Talley, W. and Iriogbe, B. 2023. College students mental health challenges: Concerns and considerations in the COVID-19 pandemic. *Journal of College Student Psychotherapy*, 37 (1): 39-51.
- Sallam, M. 2021. COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. *Vaccine*, 9 (2): 160.
- Saunders, M., Lewis, P. and Thornhill, A. 2009. Research methods for business students. Pearson education.
- Schippers, M. C. and Rus, D. C. 2021. Optimizing decision-making processes in times of COVID-19: using reflexivity to counteract information-processing failures. *Frontiers in Psychology*, 12: 650525.
- Schmeelk, S., Davis, A., Li, Q., Shippey, C., Utah, M., Myers, A., Turchioe, M. R. and Creber, R. M. 2022. Monitoring symptoms of COVID-19: review of mobile apps. *JMIR mHealth and uHealth*, 10 (6): e36065.
- Schmidt, K., Faerch, K., Zoffmann, V., Amadid, H. and Varming, A. R. 2022. The process of health behaviour change following participation in a randomised controlled trial targeting prediabetes: A qualitative study. *Diabetic Medicine*, 39 (4): e14748.
- Sewpaul, R., Sifunda, S., Gaida, R., Mokhele, T., Naidoo, I. and Reddy, S. P. 2023. Vaccine hesitancy and related factors among South African adults in 2021: unpacking uncertainty versus unwillingness. *Frontiers in Public Health*, 11.
- Sheldon, E., Simmonds-Buckley, M., Bone, C., Mascarenhas, T., Chan, N., Wincott, M., Gleeson, H., Sow, K., Hind, D. and Barkham, M. 2021. Prevalence and risk factors for mental health problems in university undergraduate students: A systematic review with meta-analysis. *Journal of Affective Disorders*, 287: 282-292.
- Shelus, V. S., Frank, S. C., Lazard, A. J., Higgins, I. C., Pulido, M., Richter, A. P. C., Vandegrift, S. M., Vereen, R. N., Ribisl, K. M. and Hall, M. G. 2020. Motivations and barriers for the use of face coverings during the COVID-19 pandemic: messaging insights from focus groups. *International Journal of Environmental Research and Public Health*, 17 (24): 9298.

Shen, A. K., Browne, S., Srivastava, T., Kornides, M. L. and Tan, A. S. 2023. Trusted messengers and trusted messages: The role for community-based organizations in promoting COVID-19 and routine immunizations. *Vaccine*, 41 (12): 1994-2002.

Shen, F., Sheer, V. C. and Li, R. 2015. Impact of narratives on persuasion in health communication: A meta-analysis. *Journal of Advertising*, 44 (2): 105-113.

Shepherd, D. and Mohohlwane, N. 2021. The impact of COVID-19 in education—more than a year of disruption. National Income Dynamics (NIDS)-Coronavirus Rapid Mobile Survey (CRAM) Wave, 5: 1-41.

Sheppard, J. and Thomas, C. B. 2021. Community pharmacists and communication in the time of COVID-19: Applying the health belief model. *Research in Social and Administrative Pharmacy*, 17 (1): 1984-1987.

Shmueli, L. 2021a. Predicting intention to receive COVID-19 vaccine among the general population using the health belief model and the theory of planned behavior model. *BMC Public Health*, 21 (1): 1-13.

Shmueli, L. 2021b. The role of incentives in deciding to receive the available COVID-19 vaccine. medRxiv, Article ID: 2021.2008. 2011.21261829.

Simelane, T. 2021. UJ Undergraduate Students' Experiences of Online Learning: Lessons from the COVID-19 Pandemic. Article ID University of Johannesburg (South Africa). Available: <https://www.proquest.com/openview/7d85a434550133529540cc9f925fbd31/1?pq-origsite=gscholar&cbl=2026366&diss=y> (Accessed 10 January 2024).

Singh, K. 2021. 'It is not true' - KwaZulu-Natal education dept denies claims that teacher vaccinations end Friday. News24, 24 June 2021 Available: <https://www.news24.com/news24/southafrica/news/it-is-not-true-kwazulu-natal-education-dept-denies-claims-that-teacher-vaccinations-end-friday-20210624> (Accessed 26 August 2021).

Sisson, H. and Wilkinson, Y. 2019. An integrative review of the influences on decision-making of young people about human papillomavirus vaccine. *The Journal of School Nursing*, 35 (1): 39-50.

Soares, P., Rocha, J. V., Moniz, M., Gama, A., Laires, P. A., Pedro, A. R., Dias, S., Leite, A. and Nunes, C. 2021. Factors associated with COVID-19 vaccine hesitancy. *Vaccines*, 9 (3): 300.

Son, C., Hegde, S., Smith, A., Wang, X. and Sasangohar, F. 2020. Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of Medical Internet Research*, 22 (9): e21279.

Soni, G. K., Seth, S., Arora, S., Singh, K., Kumari, A., Kanagat, N. and Fields, R. 2023. Harnessing the power of collaboration to expand the coverage and equity of COVID-19 vaccinations in India: a community collaboration model. *Vaccine*, 11 (6): 1022.

Sprengholz, P., Betsch, C. and Böhm, R. 2021. Reactance revisited: Consequences of mandatory and scarce vaccination in the case of COVID-19. *Applied Psychology: Health and Well-Being*, 13 (4): 986-995.

SteelFisher, G. K., Blendon, R. J. and Caporello, H. 2021. An uncertain public—encouraging acceptance of Covid-19 vaccines. *New England Journal of Medicine*, 384 (16): 1483-1487.

Steenberg, B., Myburgh, N., Sokani, A., Ngwenya, N., Mutevedzi, P. and Madhi, S. A. 2022. COVID-19 vaccination rollout: Aspects of acceptability in South Africa. *Vaccine*, 10 (9): 1379.

Steenkamp, I. and Tekelas, F. 2021. The Influence of Triangulation.

Stellefson, M., Paige, S. R., Chaney, B. H. and Chaney, J. D. 2020. Evolving role of social media in health promotion: updated responsibilities for health education specialists. *International Journal of Environmental Research and Public Health*, 17 (4): 1153.

Stout, M. E., Christy, S. M., Winger, J. G., Vadaparampil, S. T. and Mosher, C. E. 2020. Self-efficacy and HPV vaccine attitudes mediate the relationship between social norms and intentions to receive the HPV vaccine among college students. *Journal of Community Health*, 45: 1187-1195.

Su, Z., McDonnell, D., Wen, J., Cheshmehzangi, A., Ahmad, J., Goh, E., Li, X., Šegalo, S., Mackert, M. and Xiang, Y.-T. 2021. Young adults' preferences for influenza vaccination campaign messages: Implications for COVID-19 vaccine intervention design and development. *Brain, Behavior, & Immunity-Health*, 14: 100261.

Suess, C., Maddock, J. E., Dogru, T., Mody, M. and Lee, S. 2022. Using the health belief model to examine travelers' willingness to vaccinate and support for vaccination requirements prior to travel. *Tourism Management*, 88: 104405.

Sukazi, N. 2021. DUT partnered with eThekweni and provincial Departments of Health to provide covid-19 vaccination. Durban University of Technology, 27 May 2021 Available: <https://www.dut.ac.za/dut-partnered-with-ethekwini-and-provincial-departments-of-health-to-provide-covid-19-vaccination/> (Accessed 06 August 2021).

Suleman, M. H. and Lucero-Prisno III, D. E. 2022. South Africa's COVID-19 vaccine rollout amid the emergence of Omicron. *Population Medicine*, 4 (January): 1-2.

Superio, D. L., Anderson, K. L., Oducado, R. M. F., Luceño, M. T., Palcullo, V. E. V. and Bendalian, M. V. T. 2021. The information-seeking behavior and levels of knowledge, precaution, and fear of college students in Iloilo, Philippines amidst the COVID-19 pandemic. *International Journal of Disaster Risk Reduction*, 62: 102414.

Suppan, M., Stuby, L., Fehlmann, C. A., Abbas, M., Achab, S., Harbarth, S. and Suppan, L. 2022. The impact of three communication channels on the dissemination of a serious game designed to enhance COVID-19 prevention. *International Journal of Environmental Research and Public Health*, 19 (16): 10143.

Sutanapong, C. and Louangrath, P. 2015. Descriptive and inferential statistics. *International Journal of Research & Methodology in Social Science*, 1 (1): 22-35.

Taggart, T., Grewe, M. E., Conserve, D. F., Gliwa, C. and Isler, M. R. 2015. Social media and HIV: a systematic review of uses of social media in HIV communication. *Journal of Medical Internet Research*, 17 (11): e248.

Taherdoost, H. 2016. Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research. How to test the validation of a questionnaire/survey in a research (August 10, 2016), Article ID.

Tasnim, S., Hossain, M. M. and Mazumder, H. 2020. Impact of rumors and misinformation on COVID-19 in social media. *Journal of Preventive Medicine and Public Health*, 53 (3): 171-174.

Taştekin Ouyaba, A., Özyürek, P. and Sevil, Ü. 2023. The effect of an information, motivation, and behavioral skills model intervention on young women's intention to get an HPV vaccine. *Psychology, Health & Medicine*, 28 (3): 732-742.

Taylor, N. 2011. Priorities for addressing South Africa's education and training crisis. Review commissioned by the National Planning Commission. Johannesburg: JET Education Services, Article ID.

Taywade, M., Chandanshive, P. D. and Pradhan, S. K. 2021. COVID-19 pandemic and role of behavior change communication. *Current Medical Research*, 19: 185-187.

Thendele, M. 2018. Factors contributing to cigarette smoking and its health effects amongst university students South Africa. Article ID. Available: <http://hdl.handle.net/11602/1081> (Accessed 08 September 2024).

Thinane, J. S. 2022. Religious perspectives on vaccination: Mandatory Covid-19 vaccine for SA churches. Article ID.

Thorpe, A., Fagerlin, A., Butler, J., Stevens, V., Drews, F. A., Shoemaker, H., Riddoch, M. S. and Scherer, L. D. 2022. Communicating about COVID-19 vaccine development and safety. *PloS One*, 17 (8): e0272426.

Thurmond, V. A. 2001. The point of triangulation. *Journal of nursing scholarship*, 33 (3): 253-258.

Toff, B., Badrinathan, S., Mont'Alverne, C., Ross Arguedas, A., Fletcher, R. and Nielsen, R. K. 2020. What we think we know and what we want to know: Perspectives on trust in news in a changing world. Reuters Institute for the Study of Journalism, Article ID.

Toquero, C. M. 2020. Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research*, 5 (4).

Tran, B. X., Dang, A. K., Thai, P. K., Le, H. T., Le, X. T. T., Do, T. T. T., Nguyen, T. H., Pham, H. Q., Phan, H. T. and Vu, G. T. 2020. Coverage of health information by different sources in communities: implication for COVID-19 epidemic response. *International Journal of Eenvironmental Research and Public Health*, 17 (10): 3577.

Tufte, T. 2002. Edutainment in HIV/AIDS prevention. Building on the Soul City experience in South Africa. *Approaches to development Communication*, Article ID: 394-419.

Udo, A. 2022. Communication and Crisis Information Campaigns: Perspectives of Constructivism, Conspiracy and Misinformation of Covid-19 messages in West Africa. *Journal of Social Sciences and Management Studies*, 1 (3): 109-118.

Umeta Chali, B., Melaku, T., Berhanu, N., Mengistu, B., Milkessa, G., Mamo, G., Alemu, S. and Mulugeta, T. 2021. Traditional medicine practice in the context of COVID-19 pandemic: community claim in Jimma zone, Oromia, Ethiopia. *Infection and Drug Resistance*, Article ID: 3773-3783.

Umviligihozo, G., Mupfumi, L., Sonela, N., Naicker, D., Obuku, E. A., Koofhethile, C., Mogashoa, T., Kapaata, A., Ombati, G. and Michelo, C. M. 2020. Sub-Saharan Africa preparedness and response to the COVID-19 pandemic: A perspective of early career African scientists. *Wellcome open research*, 5.

- UNICEF. 2024. *GOAL 3: Good Health and Well-being*. Available: <https://data.unicef.org/sdgs/goal-3-good-health-wellbeing/> (Accessed 04 September 2024).
- Vaismoradi, M., Jones, J., Turunen, H. and Snelgrove, S. 2016. Theme development in qualitative content analysis and thematic analysis. Article ID.
- Van Der Berg, S. and Hofmeyr, H. 2018. Education in South Africa. World Bank.
- van Schalkwyk, F. 2021. Reflections on the public university sector and the covid-19 pandemic in South Africa. *Studies in Higher Education*, 46 (1): 44-58.
- Van Wyngaard, A. and Whiteside, A. 2021. AIDS and COVID-19 in southern Africa. *African Journal of AIDS Research*, 20 (2): 117-124.
- Varpio, L., Paradis, E., Uijtdehaage, S. and Young, M. 2020. The distinctions between theory, theoretical framework, and conceptual framework. *Academic Medicine*, 95 (7): 989-994.
- Vázquez, E., Chobdee, J., Nasrollahzadeh, N. and Cheney, A. 2022. Personal freedom and social responsibility in slowing the spread of COVID-19: a rapid qualitative study. *Health Education & Behavior*, 49 (1): 26-34.
- Veil, S. R., Buehner, T. and Palenchar, M. J. 2011. A work-in-process literature review: Incorporating social media in risk and crisis communication. *Journal of Contingencies and Crisis Management*, 19 (2): 110-122.
- Velavan, T. P. and Meyer, C. G. 2021. COVID-19: a PCR-defined pandemic. *International Journal of Infectious Diseases*, 103: 278-279.
- Vellingiri, B., Jayaramayya, K., Iyer, M., Narayanasamy, A., Govindasamy, V., Giridharan, B., Ganesan, S., Venugopal, A., Venkatesan, D. and Ganesan, H. 2020. COVID-19: A promising cure for the global panic. *Science of the Total Environment*, 725: 138277.
- Venema, T. A. and Pfattheicher, S. 2021. Perceived susceptibility to COVID-19 infection and narcissistic traits. *Personality and Individual Differences*, 175: 110696.
- Verdín, D., Smith, J. M. and Lucena, J. C. 2021. Recognizing the funds of knowledge of first-generation college students in engineering: An instrument development. *Journal of Engineering Education*, 110 (3): 671-699.
- Viechtbauer, W., Smits, L., Kotz, D., Budé, L., Spigt, M., Serroyen, J. and Crutzen, R. 2015. A simple formula for the calculation of sample size in pilot studies. *Journal of Clinical Epidemiology*, 68 (11): 1375-1379.
- Vigsø, O. 2010. Naming is Framing: Swine Flu, New Flu, and A (H1N1). *Observatorio (OBS\*)*, 4 (3).
- Visser, M. and Law-van Wyk, E. 2021. University students' mental health and emotional wellbeing during the COVID-19 pandemic and ensuing lockdown. *South African Journal of Psychology*, 51 (2): 229-243.
- Volks, C. 2004. The role of tertiary institutions in the HIV/AIDS epidemic. In: *AIDS and South Africa: The social expression of a pandemic*. Springer, 161-175. Available: [https://link.springer.com/chapter/10.1057/9780230523517\\_8](https://link.springer.com/chapter/10.1057/9780230523517_8) (Accessed 08 September 2024).

- Walker, M. and McLean, M. 2013. Professional education, capabilities and the public good: The role of universities in promoting human development. Routledge.
- Walrave, M., Waeterloos, C. and Ponnet, K. 2020. Adoption of a contact tracing app for containing COVID-19: A health belief model approach. *JMIR Public Health and Surveillance*, 6 (3): e20572.
- Wang, C., Yan, S., Jiang, H., Guo, Y., Gan, Y., Lv, C. and Lu, Z. 2022. Socio-demographic characteristics, lifestyles, social support quality and mental health in college students: a cross-sectional study. *BMC Public Health*, 22 (1): 1583.
- Wang, H., Li, L., Wu, J. and Gao, H. 2021. Factors influencing COVID-19 knowledge-gap: a cross-sectional study in China. *BMC Public Health*, 21: 1-11.
- Wang, L. 2019. Research on the Crisis Management Problems and Countermeasures of Colleges and Universities in Micro Age. *Open Journal of Social Sciences*, 8 (1): 244-252.
- Wang, Y. 2006. Value changes in an era of social transformations: College-educated Chinese youth. *Educational Studies*, 32 (2): 233-240.
- Wangenge-Ouma, G. and Kupe, T. 2022. Seizing the COVID-19 conjuncture: Re-positioning higher education beyond the pandemic. In: Re-imagining educational futures in developing countries. Springer, 17-37. Available: [https://link.springer.com/chapter/10.1007/978-3-030-88234-1\\_2](https://link.springer.com/chapter/10.1007/978-3-030-88234-1_2) (Accessed 12 December 2022).
- Washburn, L. 2020. Understanding the Health Belief Model. Associate Professor and Community Health Specialist Department of Family and Consumer Sciences, Article ID.
- Weintraub, R. L., Subramanian, L., Karlage, A., Ahmad, I. and Rosenberg, J. 2021. COVID-19 Vaccine To Vaccination: Why Leaders Must Invest In Delivery Strategies Now: Analysis describe lessons learned from past pandemics and vaccine campaigns about the path to successful vaccine delivery for COVID-19. *Health Affairs*, 40 (1): 33-41.
- Wells, A., Allen-Brown, V., Alam, N., Skulski, C., Jackson, A. L. and Herzog, T. J. 2021. The importance of information, motivation, and behavioral skills (IMB): Healthcare provider perspectives on improving adherence to cervical cancer screening among at-risk women. *Public Health in Practice*, 2: 100079.
- Welman, J. C., Kruger, S. J. and Mitchell, B. 2005. Research Methodology. 3<sup>rd</sup> edition ed. Cape Town, South Africa: Oxford University Press.
- Whitehead, H. S., French, C. E., Caldwell, D. M., Letley, L. and Mounier-Jack, S. 2023. A systematic review of communication interventions for countering vaccine misinformation. *Vaccine*, 41 (5): 1018-1034.
- Williams, B. M. 2022. The ethics of selective mandatory vaccination for COVID-19. *Public Health Ethics*, 15 (1): 74-86.
- Williams, S. N., Dienes, K., Jaheed, J., Wardman, J. K. and Petts, J. 2023. Effectiveness of communications in enhancing adherence to public health behavioural interventions: a COVID-19 evidence review. *Philosophical Transactions of the Royal Society A*, 381 (2257): 20230129.
- Willis, N., Hill, S., Kaufman, J., Lewin, S., Kis-Rigo, J., De Castro Freire, S. B., Bosch-Capblanch, X., Glenton, C., Lin, V. and Robinson, P. 2013. "Communicate to vaccinate": the

development of a taxonomy of communication interventions to improve routine childhood vaccination. *BMC International Health and Human Rights*, 13: 1-16.

Wiysonge, C. S., Ndwandwe, D., Ryan, J., Jaca, A., Batouré, O., Anya, B.-P. M. and Cooper, S. 2022. Vaccine hesitancy in the era of COVID-19: could lessons from the past help in divining the future? *Human Vaccines & Immunotherapeutics*, 18 (1): 1-3.

Wong, L. P., Alias, H., Wong, P.-F., Lee, H. Y. and AbuBakar, S. 2020. The use of the health belief model to assess predictors of intent to receive the COVID-19 vaccine and willingness to pay. *Human Vaccines & Immunotherapeutics*, 16 (9): 2204-2214.

Wong, M. C., Wong, E. L., Huang, J., Cheung, A. W., Law, K., Chong, M. K., Ng, R. W., Lai, C. K., Boon, S. S. and Lau, J. T. 2021. Acceptance of the COVID-19 vaccine based on the health belief model: A population-based survey in Hong Kong. *Vaccine*, 39 (7): 1148-1156.

World Health Organisation. 2020. *COVID-19 Vaccines*. Available: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines> (Accessed 03 September 2024).

World Health Organization, W. 2020. Naming the coronavirus disease (COVID-19) and the virus that causes it. *Brazilian Journal of Implantology and Health Sciences*, 2 (3).

Writer, S. 2020. The coronavirus picture has changed dramatically: KZN premier. *Business Tech* Available: <https://businesstech.co.za/news/government/420067/the-coronavirus-picture-has-changed-dramatically-kzn-premier/> (Accessed 06 August 2021).

Writer, S. 2021. Universities in South Africa told to prepare for a year of Covid-19 restrictions. *BUSINESS TECH*, 30 March 2021 Available: <https://businesstech.co.za/news/business/479533/universities-in-south-africa-told-to-prepare-for-a-year-of-covid-19-restrictions/> (Accessed 10 July 2021).

Wu, A. W., Connors, C. and Everly Jr, G. S. 2020. COVID-19: peer support and crisis communication strategies to promote institutional resilience: American College of Physicians.

Wu, M.-J., Zhao, K. and Fils-Aime, F. 2022. Response rates of online surveys in published research: A meta-analysis. *Computers in Human Behavior Reports*, 7: 100206.

Xia, S. and Nan, X. 2024. Motivating COVID-19 vaccination through persuasive communication: A systematic review of randomized controlled trials. *Health Communication*, 39 (8): 1455-1478.

Xie, C., Zhang, J., Morrison, A. M. and Coca-Stefaniak, J. A. 2021. The effects of risk message frames on post-pandemic travel intentions: The moderation of empathy and perceived waiting time. *Current Issues in Tourism*, Article ID: 1-20.

Xiong, Y., Gao, M., van Duijn, B., Choi, H., van Horssen, F. and Wang, M. 2021. International policies and challenges on the legalization of traditional medicine/herbal medicines in the fight against COVID-19. *Pharmacological Research*, 166: 105472.

Xolo, N. 2020. COVID-19: Concerns mount over COVID-19 stigma in KZN. Spotlight Available: <https://www.spotlightnsp.co.za/2020/05/21/covid-19-concerns-mount-over-covid-19-stigma-in-kzn/> (Accessed 06 August 2021).

Xu, H. and Wang, J. 2023. An information-motivation-behavioral skills model-based intervention for patients with epilepsy. *Epilepsy & Behavior*, 147: 109408.

- Xu, M., Luo, Z., Xu, H. and Wang, B. 2022. Media bias and factors affecting the impartiality of news agencies during COVID-19. *Behavioral Sciences*, 12 (9): 313.
- Yamin, D. and Gavious, A. 2013. Incentives' effect in influenza vaccination policy. *Management Science*, 59 (12): 2667-2686.
- Yang, X. Y., Gong, R. N., Sassine, S., Morsa, M., Tchogna, A. S., Drouin, O., Chadi, N. and Jantchou, P. 2020. Risk perception of COVID-19 infection and adherence to preventive measures among adolescents and young adults. *Children*, 7 (12): 311.
- Yaya, S., Otu, A. and Labonté, R. 2020. Globalisation in the time of COVID-19: repositioning Africa to meet the immediate and remote challenges. *Globalization and Health*, 16 (1): 1-7.
- Yu, M., Li, Z., Yu, Z., He, J. and Zhou, J. 2020. Communication related health crisis on social media: a case of COVID-19 outbreak. *Current Issues in Tourism*, Article ID: 1-7.
- Yue, P., Wu, Y., Zhang, Y., Chen, Y., Li, J., Xu, Y. and Liu, Y. 2021. Contemplation-action-maintenance model of behaviour change for persons with coronary heart disease: A qualitative study. *Journal of Clinical Nursing*, 30 (9-10): 1464-1478.
- Yuen, V. W. H. 2022. Political attitudes and efficacy of health expert communication on the support for COVID-19 vaccination program: Findings from a survey in Hong Kong. *Vaccine*, 40 (15): 2282-2291.
- Zarani, F., Besharat, M. A., Sadeghian, S. and Sarami, G. 2010. The effectiveness of the information-motivation-behavioral skills model in promoting adherence in CABG patients. *Journal of Health Psychology*, 15 (6): 828-837.
- Zhang, Y. and Guo, L. 2021. 'A battlefield for public opinion struggle': how does news consumption from different sources on social media influence government satisfaction in China? *Information, Communication & Society*, 24 (4): 594-610.
- Zheng, H., Jiang, S. and Wu, Q. 2022. Factors influencing COVID-19 vaccination intention: The roles of vaccine knowledge, vaccine risk perception, and doctor-patient communication. *Patient Education and Counseling*, 105 (2): 277-283.
- Zhou, W., He, L., Nie, X., Wuri, T., Piao, J., Chen, D., Gao, H., Liu, J., Tubden, K. and He, M. 2022. Accuracy and timeliness of knowledge dissemination on COVID-19 among people in rural and remote regions of China at the early stage of outbreak. *Frontiers in Public Health*, 9: 554038.
- Zikargae, M. M. H. 2022. Risk communication, ethics and academic integrity in the process of minimizing the impacts of the covid-19 crisis in Ethiopian higher education. *Cogent Education*, 9 (1): 2062892.
- Zuma, S. 2021. DUT'S COVID-19 response task team hosted virtual seminars on the Covid-19 vaccines. Durban University of Technology 15 June 2021 Available: <https://www.dut.ac.za/duts-covid-19-response-task-team-hosted-virtual-seminars-on-the-covid-19-vaccines/> (Accessed 06 August 2021).
- Zwane, T. 2021. DUT to launch COVID-19 vaccination centre. Berea Mail, 07 September 2021 Available: <https://www.citizen.co.za/berea-mail/news-headlines/2021/09/07/dut-to-launch-covid-19-vaccination-centre/> (Accessed 11 September 2023).

## Attachment 1 – Request for gatekeeper permission letter

Ms Lungelo Princess Funeka  
D.PHIL Management Sciences (Public Relations & Communication)  
Durban University of Technology  
25 August 2022

Prof K Motaung – Acting Director  
Research and Postgraduate Support Department  
Durban University of Technology

### RE: GATEKEEPER’S PERMISSION TO CONDUCT RESEARCH AT THE DUT

To whom it may concern,

My name is Lungelo Princess Funeka, a D. PHIL Management Sciences (Public Relations & Communication) student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis titled “The impact of COVID-19 vaccine communication on staff and students’ choice of vaccination at a South African University”, involves the population in your institution.

I am hereby seeking consent to conduct research at Durban University of Technology with the targeted population which is staff and postgraduate students from the Department of Applied Management, Finance and Information Management and Public Management Law & Economics at Riverside Campus in Pietermaritzburg. I will be conducting interviews with 30 staff and conducting surveys with 151 postgraduate students from three postgraduate programmes offered from the Department of Applied Management, Finance and Information Management and Public Management Law & Economics.

Data for this study will be collected until data saturation is reached. All information gathered from the data collection will be used for the sole purpose of this study. Only primary researcher will have access to the information. The data collected will be stored electronically with the password to protect the information. The password will only be known by the primary researcher. Aliases will be used to protect the participants name to ensure confidentiality. Participants will be requested to provide consent to participate and the direct identifiers such as person names, addresses, personal identification numbers, or audio recordings, will be kept confidential and stored.

If you require any further information, please do not hesitate to contact me on 0722645429, or [funekalp@gmail.com](mailto:funekalp@gmail.com) alternatively you can contact my supervisor Prof. Luther-King Junior Zogli on 0338459081 or [Luther-kingZ@dut.ac.za](mailto:Luther-kingZ@dut.ac.za) or and co-supervisor Prof. Bongani Innocent Dlamini on 0338458851 or [dlaminibi@dut.ac.za](mailto:dlaminibi@dut.ac.za) .

Yours sincerely,

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Ms Lungelo Princess Funeka  
0722645429  
Email: [funekalp@gmail.com](mailto:funekalp@gmail.com)

*Attachment 1 - Request for gatekeeper permission letter*

## Attachment 2 – Permission letter



Directorate for Research and Postgraduate Support  
Durban University of Technology  
Open House  
P.O. Box 1334, Durban 4000  
Tel.: 031-3732576/7  
Fax: 031-3732946

31 October 2022

Ms Lungelo Funeka  
c/o Department of Applied Management  
Faculty of Management Sciences  
Durban University of Technology

Dear Ms Funeka

### PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers. I am pleased to inform you that the Institutional Research and Innovation Committee (IRIC) has granted **Gatekeeper Permission** for you to conduct your research “The impact of COVID-19 vaccine communication on staff and students’ choice of vaccination at a South African University.” at the Durban University of Technology. **Kindly note that this letter must be issued to the IREC for approval before you commence data collection.**

The DUT may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

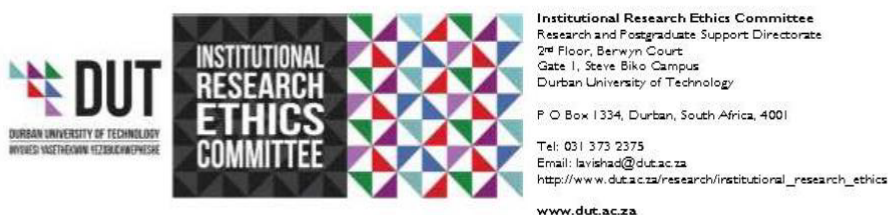
We would be grateful if a summary of your key research findings would be submitted to the IRIC on completion of your studies.

Kind regards.  
Yours sincerely

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MS V GOVENDER  
ACTING-DIRECTOR: RESEARCH AND POSTGRADUATE SUPPORT DIRECTORATE

## Attachment 3 – Ethics clearance letter



11 November 2022

Ms L P Funeka  
P.O. Box 3444  
Pietermaritzburg  
3201

Dear Ms Funeka

**The impact of COVID-19 vaccine communication on staff and students' choice of vaccination at a South African University**  
**Ethical Clearance number IREC 174/22**

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the data collection tool has been approved. Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the DUT-IREC acknowledges receipt of your gatekeeper permission letter.

Please note that **FULL APPROVAL** is granted to your research proposal. You may proceed with data collection.



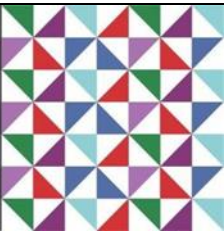
Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the DUT-IREC according to the DUT-IREC Standard Operating Procedures (SOP's).

Please note that any deviations from the approved proposal require the approval of the DUT-IREC as outlined in the DUT-IREC SOP's.

Yours Sincerely

\_\_\_\_\_  
Prof J K Adam  
Chairperson: DUT-IREC

## Attachment 4 – Letter of Information

		
<b>LETTER OF INFORMATION</b>		
<b>Title of the Research Study:</b> The impact of COVID-19 vaccine communication on staff and students' choice of vaccination at a South African University.		
<b>Principal Investigator/s/researcher:</b> Miss Lungelo Princess Funeka, Degree of Master of Management Sciences – Specialising in Public Relations and Communication		
<b>Co-Investigator/s/supervisor/s:</b> Prof. Luther-King Junior Zogli, PhD: Economics and Prof. Bongani Innocent Dlamini, PhD: Psychology.		
<b>Greeting:</b> Good day		
I hope this letter finds you well and safe.		
<b>Introduce yourself to the participant:</b> My name is Lungelo Princess Funeka, I am a student at DUT doing a full research study for my PHD degree in D.Phil. Management Sciences (Public Relations and Communication).		
<b>Invitation to the potential participant:</b> I would appreciate it if you can accept this invite to participate in the research study as a participant. Your contribution will add value and more weight to the findings.		
<b>What is research:</b> As part of the research, it is crucial to collect data that will contribute new knowledge in the field of study by presenting findings that can serve as a foundation for future research. When the research is conducted, the data is collected from participants recruited by the primary investigator/researcher.		
<b>Outline of the Procedures:</b> The vaccine rollout programme and vaccine communication are vital to mitigate the spread of coronavirus (COVID-19), yet some South African citizens are hesitant to take the vaccine. The success to curb the new infection rate lies in formal and informal vaccine communication. This necessitate the need for clear communication to address the factors that may influence the willingness to be vaccinated and to conduct research to uncover how communication strategies promote COVID-19 awareness and acceptance among university community. This study will be conducted at the Durban University of Technology in Riverside Campus, from the Department of Applied Management, Finance and Information Management and Public Management Law & Economics with staff and postgraduate students.		
The aim of this study will seek to analyse the impact of vaccine communication on staff and students' choice of vaccination for COVID-19. The objectives that guide this research are:		
<ul style="list-style-type: none"><li>• To identify communication channels used by DUT to create COVID-19 awareness among staff and students.</li><li>• To explore staff and students' source for COVID-19 vaccine and vaccination information.</li></ul>		

- To explore the process used by staff and students to verify COVID-19 vaccine and vaccination information.
- To determine COVID-19 vaccine information that influences staff and students' vaccination decision-making.

This is mixed methods research that uses quantitative and qualitative research strategy that follows exploratory research approach by adopting the exploratory sequential mixed-method design to collect data from staff and students with in-depth interviews and online surveys with both staff and students. You are expected to be part of recorded interviews that will be scheduled and conducted online, followed up by filling in a survey form that will be sent as a link using MS Teams and Google forms. Your participation in both interviews and survey will range from 20 to 60 minutes. There are approximately 214 potential participants that will be involved in this study. Data collected for this research will be analyzed using NVIVO and SPSS software.

**Risk or Discomforts to Participant:** There will be no risk or discomforts to all participants.

**Explain to the participant the reasons he/she may withdraw from the Study:** Data for this study will be collected until data saturation is reached. You have a right and may withdraw from participating in the study at any time without penalty. To withdraw from participating in this study, you will need to alert the researcher via the contact details provided at the end of the letter.

**Benefits:** You may benefit indirectly from the findings and recommendations. The findings of this study may contribute to research in Behaviour Change Communication and may be used as a foundation for future research in Communication Management and Health Education.

**Remuneration:** This study is strictly voluntary; you will not receive any remuneration for being part of this study.

**Costs of the Study:** You will not be expected to cover any costs towards the study.

**Confidentiality:** You will be requested to sign the consent letter written by the researcher. Identifying information such as your name, job title/designation or occupation and signature on the signed consent letter and audio and video recordings will be kept confidential and stored. Aliases will be used to protect your name to ensure confidentiality.

**Results:** The results of the research will be published as a thesis and two journal articles will be published online. The online link to the published work will be available from the researchers ORCID iD and DUT institutional repository. At the end of the research, you will be sent a link of the published full research.

**Research-related Injury:** This research study is not health related or dangerous. Furthermore, all COVID-19 protocols will be followed when conducting the study.

**Storage of all electronic and hard copies including tape recordings:** Only primary researcher will have access to the information. The data collected will be stored electronically with the password to protect the information. The password will only be known by the primary researcher. The signed consent letters will be stored at the secure place in Department of Applied Management for five years, thereafter the documents will be shredded, and electronic copies deleted even on recycle bin.

**Persons to contact in the Event of Any Problems or Queries:** In the event of any problems or queries, please contact the researcher (0722645429 or [funekalp@gmail.com](mailto:funekalp@gmail.com)), or Prof. Luther-King Junior Zogli my supervisor (0338459081 or [Luther-kingZ@dut.ac.za](mailto:Luther-kingZ@dut.ac.za)) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Acting

Director: Research and Postgraduate Support Prof K Motaung on 031 373 2577 or [researchdirector@dut.ac.za](mailto:researchdirector@dut.ac.za).

*Attachment 4 - Letter of Information*

**Attachment 5 – Consent letter**



**CONSENT**

**Full Title of the Study:** The impact of COVID-19 vaccine communication on staff and students' choice of vaccination at a South African University.

**Names of Researcher/s:** Miss Lungelo Princess Funeka

**Statement of Agreement to Participate in the Research Study:**

- I hereby confirm that I have been informed by the researcher, \_\_\_\_\_ (*name of researcher*), about the nature, conduct, benefits, and risks of this study - Research Ethics Clearance Number: \_\_\_\_\_,
- I have also received, read, and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during this research which may relate to my participation will be made available to me.

\_\_\_\_\_

<b>Full Name of Participant Thumbprint</b>	<b>Date</b>	<b>Time</b>	<b>Signature /</b>	<b>Right</b>
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I, \_\_\_\_\_ (name of researcher) herewith confirm that the above participant has been fully

informed about the nature, conduct and risks of the above study.

_____	_____	_____
<b>Full Name of Researcher</b>	<b>Date</b>	<b>Signature</b>
_____	_____	_____
<b>Full Name of Witness (If applicable)</b>	<b>Date</b>	<b>Signature</b>
_____	_____	_____
<b>Full Name of Legal Guardian (If applicable)</b>	<b>Date</b>	<b>Signature</b>

***Please note the following:***

Research details must be provided in a clear, simple and culturally appropriate manner and prospective participants should be helped to arrive at an informed decision by use of appropriate language (grade 10 level- use Flesch Reading Ease Scores on Microsoft Word), selecting of a non-threatening environment for interaction and the availability of peer counselling (Department of Health, 2004).

If the potential participant is unable to read/illiterate, then a right thumb print is required and an impartial witness, who is literate and knows the participant e.g. parent, sibling, friend, pastor, etc. should verify in writing, duly signed that informed verbal consent was obtained (Department of Health, 2004).

If anyone makes a mistake completing this document e.g. a wrong date or spelling mistake, a new document has to be completed. The incomplete original document has to be kept in the participant's file and not thrown away, and copies thereof must be issued to the participant.

***References:***

Department of Health: 2004. *Ethics in Health Research: Principles, Structures and Processes* <http://www.doh.gov.za/docs/factsheets/guidelines/ethnics/>

Department of Health. 2006. *South African Good Clinical Practice Guidelines*. 2nd Ed. Available at: [http://www.nhrec.org.za/?page\\_id=14](http://www.nhrec.org.za/?page_id=14)

*Attachment 5 - Consent letter*

## Attachment 6 – TRREE Certificate



**TRREE**

# Zertifikat Certificat

# Certificado Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale  
Promoting the highest ethical standards in the protection of biomedical research participants



**Clinical Trials Centre**  
The University of Hong Kong

### Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

## Lungelo Funeka

a complété avec succès - has successfully completed

### Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche  
of the TRREE training programme in research ethics evaluation

Release Date: 2021/07/20  
CID : 31a8118P1P

Professeur Dominique Sprumont  
Coordinateur TRREE Coordinator



**FMH**  
Continuing Education Program (5 Credits)  
Programme de formation continue (5 Credits)



**FPH**  
Federatio Pharmaceutica Helvetica  
Programmes de formation continue

Ce programme est soutenu par - This program is supported by :  
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (http://www.cihr-irsc.gc.ca/2891.html) - Swiss Academy of Medical Science (SAMS/ASSIMAMW) (www.sams.ch) - Commission for Research Partnerships with Developing Countries (www.crfp.ch)

(REV : 20170210)

Attachment 6 - TRREE Certificate

**Attachment 7 – Research instrument (interviews)**

**QUALITATIVE INTERVIEW – research instrument**

**The impact of COVID-19 vaccine communication on staff and students’ choice of vaccination at a South African University.**

The focus of this study seeks to analyse the impact of vaccine communication on staff and postgraduate students’ choice of vaccination for COVID-19

**SECTION A – Biographic information**

- Gender
  - a. Male
  - b. Female
  - c. Non-binary
  - d. Prefer not to say
  
- Race
  - a. Black
  - b. Coloured
  - c. Indian
  - d. White
  - e. Other
  
- Age  
.....
  
- Residential location
  - a. Pietermaritzburg
  - b. Durban
  - c. Other
  
- Home Language
  - a. English
  - b. IsiZulu
  - c. Other
  
- Department that you belong to
  - a. Applied Management
  - b. Finance & Information Management
  - c. Public Management Law & Economics

### **SECTION B – Communication strategies**

1. In your opinion how did DUT communicate health information before COVID-19?
2. Explain your experience of being involved in DUT programmes to promote health behaviour on campus. If not, elaborate why.
3. Explain how DUT ensured that staff and students were made aware of the COVID-19 pandemic?
4. Explain how your department implemented COVID-19 response strategies developed by DUT COVID-19 Response Task Team. During the COVID-19 pandemic.
5. Tell me your opinion about the impact of the response programmes launched by the DUT COVID-19 Response Task Team on staff and students' vaccination choice.

### **SECTION C – Vaccine communication and decision-making**

1. How did DUT communicate information about COVID-19 vaccines to you?
2. How did the tools of communication used by DUT to communicate COVID-19 vaccine information influence your vaccination choice?
3. On personal level, how did you get information about COVID-19 vaccine and vaccination?
4. How did you verify any COVID-19 vaccine information sent to you by DUT?
5. What type of information influenced your vaccination decision?
6. After you made your vaccination decision, how did you influence other people on vaccination?
7. If you were to encourage staff and students to vaccinate for COVID-19, what type of information would you share with them?
8. In your opinion, what type of information would you have wished to be shared regarding vaccination.
9. In your opinion, how can DUT encourage staff and students to get vaccinated?
10. What are your thoughts about COVID-19 vaccination for staff and students in general?

***Thank you for participating in this study.***

*Attachment 7 - Research instrument (interviews)*

**Attachment 8 – Research instrument (survey)**

**QUANTITATIVE QUESTIONNAIRE – SURVEY**

**The impact of vaccine communication on staff and postgraduate students' choice of vaccination for COVID-19**

The focus of this study seeks to analyse the impact of vaccine communication on staff and postgraduate students' choice of vaccination for COVID-19

By selecting the "Yes" option you hereby voluntarily grant permission for participation in the survey.

- Yes
- No

**SECTION A**

**Biographic information**

- Designation
  - Staff
  - Student
  
- Gender
  - a. Male
  - b. Female
  - c. Non-binary
  - d. Prefer not to say
  
- Race
  - a. Black
  - b. Coloured
  - c. Indian
  - d. White
  - e. Other
  
- Age  
.....
  
- Residential location
  - a. Pietermaritzburg
  - b. Durban
  - c. Other
  
- Home Language
  - a. English
  - b. IsiZulu
  - c. Other

- Department that you belong to
  - a. Applied Management
  - b. Finance & Information Management
  - c. Public Management Law & Economics

<b>SECTION B</b>							
		Strongly agree	Slightly agree	Agree	Neutral	Disagree	Strongly disagree
<b>1. COVID-19 COMMUNICATION STRATEGIES</b>							
<b>1.1. What type of COVID-19 prevention strategies do you prefer?</b>							
a.	University Pinboard – website, statements, and emails						
b.	Webinars and virtual seminars						
c.	Testing						
d.	Weekly campaigns						
e.	Interactive approach – edutainment						
<b>1.2. From the DUT COVID-19 Response programmes, which aspect is mostly addressed?</b>							
a.	COVID-19 awareness and acceptance						
b.	COVID-19 vaccine rollout programme						
c.	COVID-19 vaccine hesitancy and vaccine dropout						
d.	COVID-19 vaccine beliefs, religious and cultural approach						
e.	COVID-19 vaccine mandatory and university policy						
<b>2. TOOLS OF COMMUNICATION FOR COVID-19 INFORMATION</b>							
<b>2.1. Which communication tools do you mostly pay attention to?</b>							
a.	Informal communication – social media and blogs						
b.	Mass media communication – the media: TV, Radio & newspapers						
c.	Formal communication – university Pinboard/e-mails						

d.	Formal communication – statements & speeches from community leaders							
e.	Formal communication – organisations websites: WHO, Department of Health, DUT							
<b>3. COVID-19 VACCINE INFORMATION</b>								
<b>3.1. Where did you source information about COVID-19 vaccine and vaccination?</b>								
a.	The media – TV, radio, and newspaper							
b.	Social media – Facebook, Twitter, Tiktok, Instagram, WhatsApp							
c.	Influential people – celebrities, community leaders, religious leaders							
d.	Family members, friends, colleagues							
e.	University Pinboard – website, statements, and emails							
<b>3.2. Best describe how you feel about COVID-19 vaccine information disseminated by the institution (DUT)</b>								
a.	The information was up to date/current							
b.	The information was clear and easily understood							
c.	The information was misleading							
d.	I had to verify the information							
e.	The information was sent (emailed/posted) late							
<b>3.3. Best describe how you feel about COVID-19 vaccine information posted on the social media</b>								
a.	The information I wanted was easy to find							
b.	The information posted was clear and easily understood							
c.	The information was misleading							
d.	I had to verify the information							
e.	The information was posted late							
<b>3.4. Social media platforms used to access COVID-19 vaccine information</b>								

a.	Facebook							
b.	Instagram							
c.	Twitter							
d.	Tiktok							
e.	WhatsApp							
<b>4. VERIFICATION OF COVID-19 VACCINATION INFORMATION</b>								
<b>4.1. How did you verify vaccine information that you have received or sourced?</b>								
a.	Compare it with official statements from the community leaders							
b.	Compare it with mass media communication – the media: TV, Radio & newspapers							
c.	Compare it with university official communication via website, statements, and emails							
d.	Compare it with the information release by World Health Organisation official statements							
<b>5. VACCINATION DECISION-MAKING</b>								
<b>1.1. Which vaccine information that is more likely to influence your decision about COVID-19 vaccine and vaccination?</b>								
a.	Perceived benefits of the vaccine							
b.	Mode of administration							
c.	Effectiveness of the vaccine							
d.	Availability of the vaccine							
e.	Regulatory information							
f.	Perceived risks of the vaccine							
g.	Possible long-term side effects							
<b>6. PERCEPTION ON VACCINE HESITANCY</b>								
a	Poor or lack of communication							

b	Health issues – possible side effects							
c	Political issues – distrust from the leaders or government							
d	Religious beliefs and cultural beliefs							
e	Personal issues – fear of needles							
f	Experience about any type of vaccination							
g	Testimonials from people who have taken the vaccine							
<b>7. BEHAVIOUR CHANGE COMMUNICATION &amp; HEALTH BELIEF MODEL</b>								
<b>7.1. Which factors that influences the vaccine hesitancy were addressed in the COVID-19 vaccine information disseminated by DUT?</b>								
a.	Socio-economic factors							
b.	Socio-cultural factors							
c.	Health system factors							
d.	Political and legal factors							
f.	Ethical factors							
<b>7.2. Has the information disseminated by DUT about COVID-19 and vaccination influenced your health behaviour positively?</b>								
<b>7.3. Did DUT thoroughly inform, educate, and created awareness about COVID-19 and vaccination among the university community?</b>								
<b>7.4. Are COVID-19 vaccination campaigns necessary in a university environment?</b>								

- Considering everything, will you take the vaccine?
  - a. Yes
  - b. No
  - c. I only took the 1<sup>st</sup> dose

d. Fully vaccinated

***Thank you for participating in this study.***

*Attachment 8 - Research instrument (survey)*

