STUDENT EXPERIENCES OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN PUBLIC HEALTH STUDIES IN HIGHER EDUCATION IN SOUTH AFRICA

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I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

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ABSTRACT

This study investigated students' experiences of the integration of artificial intelligence (AI) in public health studies in South African higher education. With an increasing global interest in incorporating AI technology into educational contexts, public health education is looking for effective approaches to integrate AI into teaching and learning processes. The aim of this research was to look at the benefits and drawbacks of AI integration, identify ethical concerns about its use, investigate strategies for removing technological barriers to student access, and propose a framework for effectively implementing AI in South African higher education. The study used a case study methodology with a qualitative research design, using students enrolled in public health programmes as the case study. Connectivism and TAM guided the study's interpretation of the findings. Data were gathered through online questionnaires, semi-structured interviews, and document analysis then thematically analysed to provide detailed insights into students' perceptions and experiences.

The findings demonstrate that AI is a valuable tool for improving data-driven decision-making, administrative and research duties, and learning outcomes. The study also discovered that AI encourages personal development and broadens critical thinking skills among users. This study further showed that ChatGPT was the most popular AI tool among students, mostly for knowledge generation and improving comprehension of difficult subjects. The study, however, identified challenges, including AI-generated content that is inaccurate and ambiguous, misleading or obsolete information, and poor citation procedures. Ethical concerns arose, mainly around plagiarism, in which students may present AI-generated work as their own without proper acknowledgment. To address these ethical concerns, the study recommended creating explicit institutional policies and standards to control and guide the ethical use of AI in teaching and learning. The study also highlighted the need to address infrastructural and digital disparities as not all students have constant access to computers or dependable internet connectivity. It is thus proposed that AI be integrated into institutional digital libraries or learning platforms that allow access to laptops and other technical resources. Based on these findings, the

study proposed a framework for effectively integrating AI into teaching and learning processes in South African higher education.

Keywords: Artificial intelligence, Integration, ChatGPT, Connectivism, TAM, Ethical concerns, Learning

NKOMISO XITSONGA

Ndzavisiso lowu wu lavisisile ntokoto wa machudeni wa nhlanganelo wa vutlhari bya xiphaza (VX) eka tidyondzo ta rihanyo ra vanhu eka dyondzo ya le henhla eAfrika-Dzonga. Hi ku engeteleka ka ntsakelo wa misava hinkwayo eku katseni ka thekinoloji ya VX eka vundzeni bya swa dyondzo, tidyondzo ta rihanyo ra vaaki ti langutisa eka maendlelo yo tirhiseka ku katsa VX eka madyondziselo na madyondzelo. Xikongomelo xa ndzavisiso lowu a ku ri ku langutisa eka mivuyelo na swiphiqo swa nhlanganelo swa VX, ku komba endlelo ra ximunhu mayelana ni matirhiselo ya rona, ku kambisisa switirateji swa masuselo ya swirhalanganyi swa swa thekinoloji eka ku fikelela ka xichudeni, na ku bumabumela rimba ra matirhiselo ya VX hi ku hetiseka eka dyondzo ya le henhla eAfrika-Dzonga. Ndzavisiso wu tirhisile maendlelo ya xiyenge xa dyondzo na vutshila bya ndzavisiso bya nkoka, ku tirhisa machudeni lama ma nga tsarisa tiphurogireme ta rihanyo ra vaaki tanihi xiyenge xa dyondzo. Marimba mambirhi ya swa miehleketo, Vuhlanganisi na TAM, swi letela nhlanganelo wa ndzavisiso wa mivuyelo. Datara yi hlengeletiwile hi ku tirhisa nuvu wa swivutiso leswi hlamuriwaka hi mani na mani leswi kumekaka eka inthanete, tiinthavhiyu ta xivumbeko xo ka xi nga helelangiki, na nkambisiso wa tsalwa ra ximfumo endzhaku ka sweswo ri kambisisiwa hi ku ya hi ndlela leyi swi fambelanaka ni swikongomelo ku nyika matwisiselo hi vuxokoxoko eka mavonelo na vutivi bya machudeni.

Mivuyelo yi kombisile leswaku VX i xitirhisiwa xa nkoka xo antswisa mitirho yo kumisisa datara ku endla xiboho, vufambisi na mivuyelo ya dyondzo. Nakambe ndzavisiso wu kumile leswaku VX yi khutaza ku antswisa ka munhu un'we no ndlandlamuxa swikili swa miehleketo yo hluteka exikarhi ka vatirhisi. Ndzavisiso lowu wu ya emahlweni wu kombisa leswaku ChatGPT hi yona a yi dumile swinene tanihi xitirhisiwa exikarhi ka machudeni, ngopfungopfu ka vutumbuluxi bya vutivi no antswisa matwisiselo eka tidyondzo to tika. Nkoka wa ndzavisiso, hambiswiritano, mitlhontlho leyi kombisiweke, ku katsa vundzeni bya VX lebyi tumbuluxiweke lowu nga hetisekangiki na wo kanakanisa, wo hoxeka na vuxokoxoko lebyi nga hundzeriwa hi nkarhi, na maendlelo ya mitshaho leyi nga riki kahle.

Swivilelo mayelana ni mahanyelo swi humelerile, ngopfungopfu eka mayelana ni vuyivi bya matsalwa, eka leswi machudeni va nga ha nyikaka ntirho wa VX lowu tumbuluxiweke tanihi ntirho wa vona handle ko khensa hi mfanelo. Ku lulamisa swiphiqo swa maendlelo ya ximunhu, ndzavisiso wu bumabumela ku tumbuluxiwa ka tipholisi to twisiseka ta swa ndhawu na swipimelo ku lawula na ku letela tirhiselo ra endlelo ra ximunhu ka VX eka ku dyondzisa no dyondza. Nakambe ndzavisiso wu hlamuserile swilaveko swo lulamisa swa miako na ka vuxaka bya swa xidijithali tanihileswi machudeni ku nga riki hinkwawo va swi kotaka ku nkarhi hinkwawo va fikelela tikhomphyuta kumbe vutihlanganisi bya swa xidijithali bya inthanete. Hikokwalaho ka sweswo ku bumabumeriwa leswaku VX yi katsiwa eka swa xidijithali eka miako ya tilabyiburari kumbe tindhawu to dyondzela leti pfumelelaka ku fikelela eka tileputhopo na switirhisiwa swin'wana swa xithekinikali. Ku ya hi mayelana ni mivuyelo, ndzavisiso wu bumabumerile rimba ra ku katsiwa ko hetiseka ka VX eka maendlelo yo dyondza no dyondzisa eka dyondzo ya le henhla eAfrika-Dzonga.

Marito ya nkoka: Vutlhari bya xiphaza, nhlanganelo, ChatGPT, Vutihlanganisi, TAM, swiphiqo swa Maendlelo ya ximunhu, Madyondzelo

OPSOMMING **AFRIKAANS**

Hierdie studie het studente se ervarings van die integrasie van kunsmatige intelligensie (KI) in openbaregesondheidstudies in Suid-Afrikaanse hoër onderwys ondersoek. Met die toenemende wêreldwye belangstelling in die inkorporering van KI-tegnologie in opvoedkundige kontekste, ondersoek openbare gesondheidsonderwys doeltreffende benaderings om KI in onderrig- en leerprosesse te integreer. Die doel van hierdie navorsing was om die voordele en nadele van KI-integrasie te ondersoek, etiese kwessies rakende die gebruik daarvan te identifiseer, strategieë vir die verwydering van tegnologiese hindernisse tot studentetoegang te ondersoek, en ’n raamwerk vir die doeltreffende implementering van KI in Suid-Afrikaanse hoër onderwys voor te stel. Die studie het ’n gevallestudie-metodologie met ’n kwalitatiewe navorsingsontwerp gebruik, met studente wat vir openbare gesondheidsprogramme ingeskryf is as die gevallestudie. Konnektivisme en die Tegnologie-aanvaardingsmodel (TAM) het die interpretasie van die bevindinge gerig. Data is deur middel van aanlyn vraelyste, semi-gestruktureerde onderhoude en dokumentontleding ingesamel en daarna tematies ontleed om gedetailleerde insigte in studente se persepsies en ervarings te bied.

Die bevindinge toon dat KI ’n waardevolle hulpmiddel is vir die verbetering van datagedrewe besluitneming, administratiewe en navorsingstake, asook leeruitkomste. Die studie het ook bevind dat KI persoonlike ontwikkeling bevorder en kritiese denkvaardighede onder gebruikers verbreed. Verder het hierdie studie getoon dat ChatGPT die gewildste KI-hulpmiddel onder studente was, hoofsaaklik vir kennisgenerering en die verbetering van begrip van moeilike onderwerpe. Die studie het egter ook uitdagings geïdentifiseer, insluitend KI-gegenereerde inhoud wat onakkuraat en dubbelsinnig is, misleidende of verouderde inligting, en swak verwysingspraktyke. Etiese kwessies het na vore gekom, veral rondom plagiaat, waar studente KI-gegenereerde werk as hul eie mag aanbied sonder behoorlike erkenning. Om hierdie etiese kwessies aan te spreek, het die studie aanbeveel dat duidelike institusionele beleide en riglyne ontwikkel word om die etiese gebruik van KI in onderrig en leer te

reguleer en te rig. Die studie het ook die behoefte beklemtoon om infrastruktuur- en digitale ongelykhede aan te spreek, aangesien nie alle studente volgehoue toegang tot rekenaars of betroubare internetkonnektiwiteit het nie. Daar word dus voorgestel dat KI geïntegreer word in institusionele digitale biblioteke of leerplatforms wat toegang tot skootrekenaars en ander tegniese hulpbronne moontlik maak. Op grond van hierdie bevindinge het die studie ’n raamwerk voorgestel vir die doeltreffende integrasie van KI in onderrig- en leerprosesse in Suid-Afrikaanse hoër onderwys.

Sleutelwoorde: Kunsmatige intelligensie, Integrasie, ChatGPT, Konnektivisme, Tegnologie-aanvaardingsmodel, Etiese kwessies, Leer

DEDICATION

“Train up a child in the way he should go, even when he is old, he will not depart from it”- Proverbs 22:6

This thesis is dedicated to my mother, Anna Timisa “N’waManyike“ Mongwe, who has played an exceptional role in my life as a single parent. She provided me with opportunities to further my studies. She has always worked tirelessly, driven by the desire to see her children grow, succeed, and pursue better opportunities in the future. N’waBoqedaka, this is the result of your hard work and a dream coming true. I feel that your parents, kokwana Punch and N’waMakasani, now in heaven, are proud of the child you have nurtured and raised.

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To my wife, Mesiah Mukansi-Mongwe, and my three beautiful daughters, Rito, Vonani Musa, and Nsuku Werhu Mongwe, I extend my heartfelt gratitude for your love, understanding, and unwavering support during the times when my academic commitments required my absence. I recognise that there were times when I felt I was not fulfilling my role as a co-parent, and I am deeply grateful for my wife's continued commitment to supporting our children during those moments.

I wish to acknowledge my employer and UNISA for funding my studies and for granting me permission to conduct this research. I am also thankful to all participants who generously gave their time to be part of this study.

My appreciation extends to everyone who encouraged and supported me in pursuing this study, even if not mentioned by name. I sincerely thank Ms Sarah Coutts, professional editor, for her meticulous proofreading of this study. I also extend my sincere gratitude to my uncle, Mkomati John Mongwe, for his assistance with the Xitsonga abstract.

Above all, I give thanks to the God of Mount Zion for His guidance and strength throughout this journey. Without Him, this achievement would not have been possible. As it is written in 1 Thessalonians 5:18, "Give thanks in all circumstances; for this is the will of God in Christ Jesus for you."

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LIST OF ACRONYMS

Acronyms	Description
ATU	Attitude Toward Use
AU	Actual Use
BI	Behavioural Intention to Use
ChatGPT	Chat Generative Pre-Trained Transformer
CHE	Council of Higher Education
COVID-19	Coronavirus Disease 2019
DCDT	Digital/Community Development and Technology
DE	Distance Education
DHET	Department of Higher Education and Training
EU	European Union
GPT	Generative Pre-trained Transformer
GPU	Graphics Processing Unit
GenAI	Generative Artificial Intelligence
HE	Higher Education
HEI	Higher Education Institution
IMDA	Infocomm Media Development Authority
IoT	Internet of Things
IT	Information Technology
LLM	Large Language Models
LMS	Learning Management System
ML	Machine Learning
MOOC	Massive Open Online Course
MPH	Master of Public Health
MS	Microsoft
MSc	Master of Science
ODeL	Open Distance and e-Learning
ODL	Open Distance Learning

OECD	Organisation for Economic Co-operation and Development
OER	Open Educational Resources
PGDip	Postgraduate Diploma
PDPC	Personal Data Protection Commission
PEOU	Perceived Ease of Use
PhD	Doctor of Philosophy
PHE	Public Health Education
POPIA	Protection of Personal Information Act
PU	Perceived Usefulness
SMS	Short Message Service
TAM	Technology Acceptance Model
UDHR	Universal Declaration of Human Rights
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNISA	University of South Africa
US	United States
UTAUT	Unified Theory of Acceptance and Use of Technology
WEF	World Economic Forum

CHAPTER 1: ORIENTATION AND BACKGROUND

1.1 INTRODUCTION

There has been significant interest in integrating artificial intelligence (AI) technologies into educational settings in the digital age. Although AI has been utilised in education for a long time, recent developments in AI technology, notably in machine learning and natural language processing, have sparked a rush of enthusiasm and interest. On the African continent and in South Africa, where this study was conducted, the usage of AI has risen since 2020. Since the end of 2022, AI tools like ChatGPT, Sci space, Evidence Hunt, Lumina, Elicit, Perplexity, System Pro, Copilot, CopyAI, and Meta AI have become regularly available. These AI tools can potentially improve student outcomes, allow students more control over their education, and expedite several areas of the educational process. Alasadi and Baiz (2023) argued that using these AI tools carefully and morally is critical, making sure they enhance rather than replace human interaction and traditional teaching methods. In support of Alasadi and Baiz's (2023) assertion, Vincent-Lancrin and Van der Vlies (2020) mentioned that students can lose their critical thinking ability if they rely on AI technologies without employing them ethically. Mohamed (2023) stated that the educational experience for students could be improved in several ways by integrating AI technologies like ChatGPT and CopyAI into the learning environment. Mohamed (2023) further mentioned that to assess the success of this integration and determine areas for growth, it is essential to understand students' experiences.

This study of student experiences offers important insights related to integrating AI into education in a specific context. Educational institutions can benefit from developing customised curricula and instructional practices that draw on these experiences. This thesis on AI integration may also address issues that lead to an increase in AI literacy, improving the state of education, and better preparing students for a world driven by AI.

1.2 BACKGROUND TO THE RESEARCH

Adopting AI technology in African higher education is one way to improve learning experiences, increase access to high-quality education, and address specific difficulties (Mhlanga, 2023). However, to maximise AI's impact on education in Africa, infrastructure limitations and ethical issues must be addressed, making sure that AI implementations are appropriate for the local culture and context (Eke, Wakunuma & Akintoye, 2023). In an era characterised by technological advancements and the spread of AI, Bell and Bell (2023) contended that education is going through a significant transformation. Firat (2023) highlighted that AI has emerged as a viable tool for improving learning experiences in various educational contexts. The integration of AI into public health studies in higher education in South Africa is examined in this study from the perspective of the students and providing information about possible effects on student engagement and efficacy. The University under study simultaneously provides both distance education (DE) and blended learning programmes, allowing for flexible learning settings that can use AI techniques. Karam (2023) posited that AI presents a unique opportunity to close gaps and give students individualised, on-demand support as the world struggles with a growing need for accessible and cutting-edge educational experiences.

The landscape of higher education has rapidly changed as a result of the adoption of digital technology. AI-powered technology, learning management systems, and online courses are all altering how students engage with course material. Because of this, students' perceptions about using Chat Generative Pre-trained Transformer (ChatGPT) and other AI tools for learning in higher education represent a complicated interaction between possibilities and limitations. OpenAI developed the ChatGPT AI language model with the goal of understanding and generating human-like writing from input (Caelen and Blete, 2024). Even though there are several AI language models available, ChatGPT's widespread appeal, ease of use, and considerable attention in both professional and educational settings account for the aforementioned assertion (Shahzad *et al.*, 2025). It

is essential for educational institutions and instructors to understand AI language model perceptions to incorporate AI effectively into the classroom while addressing concerns, guaranteeing ethical use, and optimising the advantages of AI technology for students' academic achievement. Researchers are always searching for innovative ways to apply AI to enhance the educational experience while maintaining the calibre and integrity of higher education (Chan, 2023). As a result, at a time of rapid technological advancement, scholars and educators are constantly searching for innovative AI-driven strategies to enhance learning experiences. AI can help with these problems by offering timely support. Additionally, students in higher education frequently have challenges like understanding challenging courses, acquiring resources, or receiving timely responses from academics. Al-Maskari *et al.* (2022) reported that students frequently encounter limited access to updated learning resources and delayed response from professors due to resource restrictions and big class sizes. AI tools are being used in higher education to provide faster help because students may become frustrated by resource limitations and slow feedback (Hooda *et al.*, 2022). This study considers the distinctive environment of South African higher education, recognising the diversity of students, the difficulties they encounter, and the ability of AI to successfully address some of these issues.

1.3 PROBLEM FORMULATION

The use of AI, notably AI-driven chatbots like ChatGPT, in higher education institutions is becoming more common worldwide. Consequently, the School of Public Health at a higher education institution in South Africa where this research was conducted, is not distinct from other educational institutions utilising AI integration as its students also employ AI to enhance their education. Therefore, as Elbanna and Armstrong (2023) argued, understanding how students in an academic setting perceive the use of AI for learning is important to ensure that its implementation meets their educational needs and effectively contributes to their academic journey. While AI technologies are increasingly used in educational contexts, little is known about how students perceive using AI for

educational reasons, specifically in a South African context. Brin (2022) argued that research at Stanford University highlights similar issues, pointing out that many of the assumptions made by educational AI models are frequently based on incomplete or out-of-date data that might not accurately represent the requirements or attitudes of students today. Brin (2022) further asserted that as educators and policymakers continue to manage AI's role in altering learning environments, this dearth of thorough data on student perceptions points to an important subject for future research.

To determine the advantages, limitations, and potential effects of using AI language models like ChatGPT, it is significant to examine students' perceptions, attitudes, and experiences. Rasul *et al*. (2023) stated that although AI has significant potential for improving learning experiences, increasing access to educational resources, and addressing academic challenges, little is known about how students at the specific institution in this research perceive their incorporation into the educational framework. Additionally, Abbas *et al.* (2024) argued that it is yet unknown to educational institutions all around the world if using AI is beneficial, encourages critical thinking, and enhances teaching and learning. The risks and difficulties of using AI in education are equally significant. Significant obstacles are presented by privacy issues, data security, and the moral ramifications of AI-driven decisions in the classroom (Williamson & Eynon, 2020). Critics contend that if AI systems are overused, they could unintentionally result in less human supervision and a one-size-fits-all strategy that inhibits students' ability to think critically and creatively (Mishra & Kumar, 2023). Furthermore, depending too much on AI could perpetuate biases in the algorithms, which could disadvantage particular student groups and maintain inequality (Kunjumuhammed, 2024). These issues highlight the importance of continuously critically assessing AI and applying it carefully and intelligently in educational contexts. These issues are especially pertinent to South African higher education and open distance learning (ODL) because of the increasing use of AI tools for instruction, evaluation, and student assistance. This research is required because there is inadequate data on how AI is employed in higher education (HE), and whether these

applications improve student access and success. Even though AI apps are becoming more popular, there is still a dearth of empirical study on how these technologies affect students' access to resources, timely feedback, academic achievement, and completion rate (Ouyang *et al.*, 2022). This evidence gap highlights the pressing need for higher education research based in South Africa to investigate the ways in which AI impacts students' access to learning materials, timely feedback, academic progress, and overall completion rates. By concentrating on this context, the study hopes to offer a more regional comprehension of the advantages and difficulties of AI in ODL, guaranteeing its ethical and successful integration.

Moreover, this study focuses on how AI may improve teaching and learning, assist with educational administration, and guide policy creation to meet the different requirements of students. Specifically, the study gives insights into how AI might improve student access to resources and timely feedback as well as guidance for institutions on how to effectively integrate AI.

Research on the use of AI in education from a technical, institutional, or pedagogical standpoint is abundant, but less is known about how students perceive and interact with AI in the classroom. Chauke *et al.* (2024) investigated how postgraduate students' view ChatGPT at historically poor South African colleges. Consequently, Chauke *et al.* (2024) discovered that although AI helps students succeed academically, little is known about how they actually utilised it. The lack of empirical research on student experiences, the quick development of AI technology, and the requirement to contextualise international findings within the context of South African higher education are the main obstacles.

1.4 RESEARCH QUESTIONS

This section presents the main research question and sub-questions that led the investigation. These questions are based on the research problem, which identified the

gaps in understanding students' opinions on the use of AI in education. As a result, the main research question that guided this research is: "*How do students experience the integration of artificial intelligence into public health studies in South African higher education?*"

To address the main question, the study looked at the following research sub-questions:

I. What are the perceived benefits and limitations of incorporating artificial intelligence into higher education?
II. What are the ethical considerations of using artificial intelligence in education?
III. How does a student's lack of access to technology affect the use of artificial intelligence in education?
IV. What are the key elements of an artificial intelligence framework for teaching and learning integration in South African higher education?

1.5 AIM AND OBJECTIVES

Based on the main research question, the aim of this study is to offer a thorough understanding of how students experience the integration of artificial intelligence in public health studies in South African higher education.

Flowing from the aim, the following objectives were formulated to:

I. Explore the perceived benefits and limitations of incorporating artificial intelligence into higher education
II. Investigate the ethical concerns of implementing AI technologies in educational contexts
III. Investigate potential solutions for reducing technological barriers to students' access to AI
IV. Propose an AI framework for successfully incorporating AI into South African teaching and learning processes

1.6 THEORETICAL FRAMEWORK

Luft *et al.* (2022) mentioned that, in research, a theoretical framework is a structure that directs the investigation by establishing it in pre-existing theories and aiding in the explanation of the connections between variables or concepts. Lim (2024) posited that the goal of a theoretical framework is to give the study a solid basis, guarantee coherence, and aid in the interpretation of results in a larger perspective. As a result, incorporating a theoretical framework is crucial since it enhances the study's rigor, makes the study topic clear, and links the study to existing knowledge in the subject (Simsek *et al.*, 2025). This study used the connectivism learning theory and the Technology Acceptance Model (TAM) as its theoretical framework. Fred Davis came up with the TAM in 1985 (Davis,1985). TAM is frequently utilised in AI research because it has been useful in explaining and forecasting how students would adopt and utilise new educational tools (Sánchez-Prieto *et al.*, 2020). TAM was helpful in this study, which examined AI in higher education, in determining the elements that affect students' acceptance and incorporation of AI into their learning processes (Wang *et al.*, 2021). Downes (2019) stated that George Siemens and Stephen Downes created connectivism, which sees learning as a process of joining nodes (such as concepts, people, and resources). Thus, the theory of connectivism and TAM was applied in this study since it highlighted the importance of digital tools, networks, and connections in learning (Alam, 2023). Connectivism was employed in this study to evaluate how AI-based educational tools integrate into contemporary, networked learning environments, and it is further discussed in Chapter 2, Section 2.2.2.

1.7 RESEARCH METHODOLOGY

Research methodology encompasses the overall strategy and methods used in a study. It includes both the plan and the techniques for collecting and evaluating data. In order to

ensure that the design is in line with the research aims and questions, the research methodology embodies the general principles that direct the structure and content of the study (Dehalwar & Sharma, 2023). Mulisa (2022) argued that research design establishes the type of research – qualitative, quantitative, or mixed – and how the problem will be addressed. Conversely, the methods are the ways of gathering data, including surveys, interviews, and experiments. These methods allow researchers to collect data that either confirms or refutes theories and assumptions. When combined, the design and methods guarantee that the study is valid, dependable, and systematic, allowing researchers to make significant findings and advance our understanding. Research design and methods are imperative components of any research undertaking. They offer an organised method to data collection and analysis, ensuring that the study's objectives are addressed successfully and efficiently. Goldsmith (2021) argued that the research design offers the framework while the methods define the tools employed within that framework to carry out the study. Sukmawati (2023) stated that research methods are the instruments and procedures used to gather and examine data, such as surveys, interviews, or data analysis. Design and methodology work together to guarantee that the study's research topics are addressed in a methodical and efficient manner (Karunarathna *et al.*, 2024).

Design and methods could be used in an AI-focused study to collect student opinions about AI tools through an online questionnaire or interviews or to evaluate the efficacy of AI utilising data analytics. The study can methodically investigate and explore AI's influence in ways that complement the overall design by outlining these techniques, offering trustworthy insights on how it might improve educational experiences. Below is an overview of the design and methods**.**

1.7.1 Research Design

Pandey and Pandey (2021) described a research design as a thorough plan or strategy that explains how the study would be organised to answer the research questions. The

research design serves as a roadmap for this study, directing the research paradigm, research procedures, research type/strategy, participant selection, data collection, and data analysis, all of which will be thoroughly examined and addressed in Chapter 4, Section 4.4.

This research design describes the methodological strategy, including the procedures for gathering, analysing, and interpreting data. Asenahabi (2019) mentioned that the research design is the general structure and strategy that a researcher uses to undertake a study. Pandey and Pandey (2021) further argued that the research design acts as a guide or road map for the entire investigation, assisting the researcher in the orderly collection, evaluation, and interpretation of data. A research design must be carefully thought out to provide results that are legitimate, trustworthy, and significant (Carcary, 2020). Furthermore, the research design aids in keeping researchers organised and focused on their goals, ensuring the integrity and ethics of their research (Kang & Hwang, 2021). The next section outlines the research approach and type that were used as well as the philosophical research paradigm that informed the study's design.

1.7.1.1 Research Paradigm

According to Carcary (2020), a research paradigm is a collection of ideas and practices that govern and shape the research process within a specific field of study. The paradigm that was selected for this study had a considerable impact on the methodology, questions, and methodologies utilised to investigate how AI affects students' experiences integrating AI in higher education. Carcary (2020) further posited that it provides the overarching framework for creating research questions, collecting and processing data, and drawing conclusions. Adding to this, the research paradigm in this study represents the underlying viewpoint and influences the researcher's methodology.

Melegati and Wang (2021) mentioned that research paradigms are crucial to research philosophy and technique and are widely classified into four types: interpretivist, critical, positivist, and pragmatist paradigms. An interpretivist paradigm emphasises individual experiences and frequently employs qualitative techniques to understand intricate social events within their settings (Pervin & Mokhtar, 2022). In contrast, critical paradigms examine how systems (like AI) may support or undermine social institutions, concentrating on questions of power, inequality, and societal influence (Gerlich, 2024). Maksimovic and Evtimov (2023) indicated that positivism is related to natural sciences and is distinguished by an objective, empirical, and quantitative research approach. The authors added that positivism assumes an objective world can be viewed and quantified and that researchers should strive for objectivity and neutrality. Conversely, pragmatist researchers concentrate on what effectively solves the research challenge, frequently fusing qualitative and quantitative techniques to produce useful insights (Hampson & McKinley, 2023).

This study was able to meet the research objectives with rigour and relevance by choosing a suitable paradigm that guaranteed that the techniques and interpretations were in line with the philosophical position.

Aiming for results that are both reproducible and widely applicable, positivism assumes that there is an objective world that can be quantified and comprehended through data (Mohajan, 2020). In stark contrast to positivism, interpretivism emphasises the impact of researcher interaction on findings and focuses on understanding subjective meanings and interpretations within social contexts (Pervin & Mokhtar, 2022). Therefore, by exposing the participants' perspectives and experiences, this study used an interpretivist paradigm to specifically strive to comprehend the reality in which AI is seen as well as the circumstances under which they occur. The researcher used the participants' experiences to build and interpret their understanding, looking for situational distinctiveness and comprehension to interpret the meanings that have been formed throughout the data

gathering process. Each of these study paradigms is described in full in Section 4.3 of Chapter 4.

According to Jones *et al.* (2021), interpretivism, also known as constructivism, is related to the social sciences and humanities. Jones *et al.* (2021) argued that researchers in the interpretivist paradigm frequently employ qualitative approaches such as interviews, and document analysis to investigate the complexities of human experiences and societal phenomena. Schwarz and Reiling (2024) concur with Jones *et al*. (2021) that interpretivist approaches are frequently used in analyses to delve into the intricacies of human experiences and societal issues. Thus, the interpretivist paradigm allowed the study to gather participant experiences regarding the integration of AI in higher education. Jones *et al*. (2021) mentioned that interpretivism focuses on understanding people's subjective meanings and interpretations as well as the conditions that lead to them. An interpretivist perspective assisted this study in obtaining a more nuanced view of the phenomenon being studied by providing deeper insights into the contextual and personal elements that impact human experiences. Various research paradigms, such as constructivism, positivism, or interpretivism, influence the researcher's viewpoint on what constitutes knowledge and how it should be interpreted. Whether qualitative, quantitative, or hybrid methodologies are used, these paradigms also affect the selection of research. As a result, it is crucial to assess each paradigm's fit with the objectives and environment of the study.

1.7.1.2 Research Approach

Carcary (2020) indicated that a research approach is a systematic and methodical strategy used to carry out a research project. Carcary (2020) further mentioned that the research approach chosen is critical because it influences how data is collected, analysed, and interpreted. There are various research approaches, each of which is appropriate for a certain set of research questions and aims. They can be broadly

classified as qualitative, quantitative, or mixed-methods approaches. In a quantitative approach, patterns are found, hypotheses are tested, and correlations between variables are established by collecting and analysing numerical data (Johnson & Christensen, 2024). A mixed-methods approach, on the other hand, integrates quantitative and qualitative data to enable a more thorough analysis by fusing numerical data with more in-depth contextual insights gleaned from participant experiences (Pregoner, 2024). A qualitative research study is an in-depth examination that focuses on understanding and exploring the underlying meanings, motives, experiences, and views of individuals or groups in a given situation (Sharma *et al*., 2023). Consequently, a qualitative research approach was employed for this study as it collected non-numerical data, such as words, to acquire a deeper understanding of how AI is integrated into teaching and learning. Stutterheim and Ratcliffe (2021) posited that in educational research, qualitative research is essential because it answers the “how“ and “why“ research questions and offers a more profound comprehension of experiences, events, and context. Stutterheim and Ratcliffe (2021) argued that qualitative research allows one to pose issues that cannot be readily quantified. The use of qualitative research in this study gave a comprehensive picture of participants’ viewpoints and attitudes about technology in education, which may change and depend on context, as well as the discovery and understanding of participants’ expressions (Mertala, 2019). Moreover, utilising qualitative research gave the researcher a deeper understanding of participants’ perspectives, experiences, and beliefs concerning AI technologies in educational settings.

In accordance with this approach, a specific research type was used to achieve the study’s objectives. The study’s topic, objective, and bounds were defined in part by the qualitative approach and the selected research type (see Chapter 4, Section 4.4). The qualitative approach and the chosen study type work together to create a consistent methodological foundation for data collection, analysis, and interpretation.

1.7.1.3 Research Type

The research type chosen influences the study's design, procedures, and analysis (Tirado-Kulieva *et al.*, 2021). The choice of research type significantly impacts how the entire process is carried out. It affects the methodological framework or the general scheme and organisation of the investigation. The selected research type also dictated the methodologies for data analysis (such as theme analysis), document analysis, interviews, and questionnaires as well as the interpretive paradigm employed to make sense of the results. Essentially, the research type offers the framework that directs the design, execution, and interpretation of the study. Case studies, ethnography, grounded theory, phenomenology, and narrative research are common qualitative research methodologies used to investigate complicated human experiences (Lim, 2024; Gupta, 2024). This study used a case study approach to investigate the experiences of public health students with AI integration in higher education. Case studies enable in-depth examination of events in real-world contexts, drawing on a variety of sources including records, interviews, and observations (Bishop, 2024).

The study's focus on public health students allowed it to investigate how AI influences engagement, learning outcomes, and inclusivity as well as identify potential difficulties within a specific context. Participants were chosen for their accessibility, and the researcher maintained objectivity by not instructing them directly, thereby increasing the study's trustworthiness. This research focuses on public health studies since the curriculum is transdisciplinary and practice-oriented, making it appropriate for investigating how AI is integrated into real-world educational settings. Students in this discipline interact with a variety of content and collaborate to learn, providing valuable insights into AI's impact on engagement, resource access, and learning results. By focusing on public health, the study captures a representative but specialised scenario that underscores the larger consequences of AI deployment in South African higher education.

The study uses both descriptive and exploratory methods. Descriptive research offers an overview of existing conditions (Mulisa, 2022) whereas exploratory research clarifies poorly defined concerns or knowledge gaps (Wang *et al.*, 2021). Overall, an exploratory case study provides comprehensive, context-specific insights into AI use in higher education, aiding understanding of its benefits and drawbacks. Chapter 4, Section 4.4.2 provides more information on the process.

A discussion of the research methods and their application to this study are discussed next.

1.7.2 Research Methods

The precise strategies, instruments, and processes utilised to collect and examine data are referred to as research methods in the field of study. Pandey and Pandey (2021) mentioned that the research design, which offers the overall plan or approach for the study, is separate from, yet closely related to, the methods. Dehalwar and Sharma (2023) further stated that the research methods are the actual actions taken inside that approach to efficiently gather and analyse data whereas the research design describes the overall framework and methodology of the study, whether it is exploratory, descriptive, or evaluative. Flynn (2021) argued that a blueprint and the building procedures required to construct a structure are comparable to the relationship between research design and methods. The research design influences the selection of methods, making sure they complement the objectives of the study, much like a plan directs the building process (Flynn, 2021).

The main components of the research methods, such as selection of participants, data collection, and data analysis, are introduced in this section. Various research techniques, including document analysis, semi-structured interviews, and online questionnaires, were employed in accordance with qualitative research. While interviews would have been

sufficient for this kind of study, the researcher was able to analyse the phenomenon and improve the study by gaining both depth and breadth in its analysis, which led to more robust and comprehensive conclusions. This was made possible with an online questionnaire and document analysis.

This section lays out a brief explanation and justification for each method, even though the description and gathering of data are covered in full in Chapter 4, Section 4.4.1.

1.7.2.1 Selection of Participants

Selecting participants is an important phase in research and entails making deliberate and purposeful decisions regarding who is included in the study based on specified criteria and objectives (Pandey & Pandey, 2021). The relevance and accuracy of study findings are directly impacted by participant selection, which is an important factor in evaluating the quality of the findings (Johnson *et al.*, 2020). To guarantee that the people involved in the study are in line with the research questions and aims, Johnson *et al*. (2020) underline that researchers must carefully select participants. This meticulous deliberation eventually strengthens the trustworthiness of the results by ensuring that the data gathered is relevant and appropriate to the study's objectives. Taken together, these arguments demonstrate how crucial participant selection is to produce rigorous and reliable study findings. Participant selection is influenced by the study's objective, target population, research design, and ethical issues, and it is an important component of research planning and implementation (Priya, 2021). Mongwe (2023) asserts that applying qualitative research methodology makes it easier to carry out a range of related interpretive techniques, all of which contribute to a greater understanding of the topic at hand. Postgraduate students in public health programmes at a South African university made up the study's population. These students were chosen to examine experiences with AI integration in higher education since they are closely involved with the digital learning environment.

There were two honours degree participants, two postgraduate diploma (PGDip), nine Master of Science (MSc) degree students, and three PhD students. The study used a combination of convenience and purposive sampling methods. The online questionnaire was distributed via convenience sampling, with participants recruited from postgraduate students in public health who were easily accessible and ready to participate. Purposive sampling was then used to choose participants for the semi-structured interviews, focusing on those whose initial responses required explanation or elaboration. This method meant that follow-up interviews provided deeper insights into specific concerns, making the data more relevant and valuable. Convenience sampling was employed by the researcher, who chose participants for the study based on their accessibility, availability, and desire to take part as stated in Chapter 4, Section 4.5.2. Convenience sampling was used since the researcher needed to quickly and easily reach participants who were on hand at the institution. While still offering pertinent insights into the study context, this approach was useful for investigating students' interactions with AI without the time and logistical limitations associated with random sampling. Purposive sampling was utilised because the study wanted to collect detailed, targeted insights rather than broad generalisations. The researcher, who was employed at the institution where the study was conducted, strategically engaged administrators to recruit participants in an efficient manner while maintaining ethical integrity. This was achieved by obtaining ethical clearance prior to contacting students and confirming that participation was voluntary, and that informed consent was obtained for interviews, as cited in Chapter 4, Section 4.6. Chapter 4, Section 4.5.2 explains in detail the sampling procedure and justification.

1.7.2.2 Data Collection

According to Mohajan (2020), the methodical process of obtaining and measuring information on variables of interest for study or analysis is known as data collection. It is an essential step in many fields, including business, social sciences, healthcare, scientific

research, and more. One of the most important stages of qualitative research is data collection, which entails utilising non-numeric, text-based, or visual methods to obtain information and insights on a particular event (Mohajan, 2020). Rather than quantifying a subject, qualitative research seeks to understand its depth and context (Nassaji, 2020).

This study employed the following three data collection instruments: open-ended questionnaires, interviews, and document analysis, which are described below. Triangulation allowed the study to corroborate interview findings with observational data and document analysis, providing a more complete picture of students' experiences (Racines, 2024).

Open-ended Questionnaires

One of the methods this study used to acquire data was questionnaires with mainly open-ended questions. The online questionnaire was completed by 16 participants, compared to the study's initial expectation of 20 participants. This number was adequate, however, to enable the researcher to collect comprehensive data and successfully answer the research questions. When answering questions, participants could freely share their opinions and experiences about how they see AI being integrated into public health education through open-ended questions. Additionally, open-ended questions represented quality evaluations to permit judgment, and those evaluation criteria unavoidably molded by the assessment's context and goal (Moses, 2024). To contribute to the list of open-ended questions, the researcher used the research questions as the foundation for the broad topics to be covered. Cingillioglu *et al.* (2024) indicated that by utilising online questionnaires, researchers may effectively capture qualitative data from a wide range of participants. The researcher and the three administrators who oversee the master's, doctoral, honours, and postgraduate diploma programmes in public health coordinated the distribution of open-ended questionnaires to participants, as stated in Section 1.9.4. To obtain first insights, the researcher provided an online questionnaire to

participants. This was followed by semi-structured interviews, as explained below, which included open-ended questions to go deeper into critical subjects and further explain questionnaire responses.

Semi-structured Interviews

Semi-structured interviews were conducted after the questionnaires to delve deeper into the phenomenon and provide clarity. The researcher anticipated that this study would be flexible enough to allow participants to be interviewed online via Microsoft Teams and by phone. These modes enabled participants to participate from anywhere, reducing scheduling and travel constraints and potentially increasing participation rates. They also allowed the researcher to tailor the time and flow of the interview to the participants' availability, making it easier to accommodate unforeseen changes. The researcher created a semi-structured interview schedule that allowed for question modification as necessary to delve further into participants' answers and follow up on new information. The researcher rephrased the questions during the interview to ensure clarity and understanding. Interviews were recorded and transcribed. Following the initial data analysis, the researcher interviewed seven participants from the online questionnaire to confirm the preliminary results and obtain a more in-depth understanding. Out of the 16 participants who completed the online questionnaire, seven were purposefully chosen based on their interest in participating in follow-up interviews and their relevance to the study's goals. These interviews helped ensure that the opinions and experiences of the participants were accurately reflected in the data interpretations from the semi-structured interviews. This subset of seven allowed for an in-depth study of students' experiences and opinions, enabling the researcher to collect rich qualitative data while preserving a reasonable scope for analysis. By choosing a reasonable, smaller sample size, the researcher engaged with participants in a rich, in-depth manner and examined their opinions, attitudes, and interpretations of utilising AI tools in HE. From the pool of participants who completed the questionnaire, seven participants gave their consent to

be contacted for follow-up interviews, as specified in the questionnaire. Given that semi-structured interviews provide researchers greater freedom in investigating participants' experiences and whatever challenges they may be facing while examining how they view AI tools, they would yield a more comprehensive knowledge of students' opinions than structured interviews (Nouara & Dehbia, 2023).

Document Analysis

Mody, Hanks, and Cheng (2021) stated that document analysis is the methodical study or evaluation of printed and electronic materials. Nielbo *et al.* (2024) argued that document analysis is frequently used in qualitative research to evaluate and analyse textual material to better comprehend its meaning, context, and relevance. Books, articles, reports, emails, websites, policy documents, historical records, ads, and other materials are examples of documents. The document analysis for this study examined the guidelines for the use of generative AI in learning, teaching, and research. on the application of AI for teaching and learning, given that this was the research site. Stone (2023) argued that academic integrity documents can be used as secondary data sources for research document analysis, offering insights into the rules, regulations, and policies of the institution that influence students' experiences, behaviours, and views. This document was analysed for triangulation purposes. Following the interviews and online questionnaires, a document analysis was conducted to cross-reference information where appropriate. As a result, once the ethical clearance was granted, the guidelines for generative AI use in learning, teaching, and research were obtained from the research coordinator of the faculty and were analysed. By conducting this analysis, the study hoped to understand how the guideline regulates health sciences academic practices and how it affects the use of AI in education, ultimately promoting better teaching methods and academic integrity.

The section that follows outlines the data analysis for this study.

1.7.2.3 Data Analysis

Alem (2020) defined data analysis as the act of evaluating, purifying, transforming, and analysing data to uncover important information, develop inferences, and aid in decision-making. Williams (2019) stated that in qualitative research, data analysis refers to the methodical process of deciphering, compiling, and arranging non-numerical data, including text, pictures, audio, and cinema. In the context of this study, these data analysis principles are essential for understanding and assessing the students' experiences of the integration of AI in public health education in higher education. Cassell and Bishop (2019) posited that by utilising thematic analysis and insights found in the data, qualitative data analysis seeks to answer research questions and thoroughly examine phenomena. Christou (2024) stated that thematic analysis is a flexible and methodical method for analysing qualitative data, allowing researchers to discover meaningful patterns and insights that guide research topics, theory development, and practice.

The steps typically followed in the thematic analysis of this study, as argued by Braun and Clarke (2022), are described next. Finding, examining, and interpreting patterns or themes in qualitative data is a methodical process known as thematic analysis. Usually, the process starts with familiarisation, in which researchers read and reread the data to become fully immersed. After that, preliminary codes are generated to highlight key aspects of the data. This process entails recognising topics within the data and then arranging these codes into probable themes for study. Themes are examined to ensure they accurately represent the data, and they are adjusted as necessary to clarify their emphasis and scope. After defining and naming the themes, the final report is created, in which the themes are interwoven into a logical narrative that is supported by data snippets.

1.8 ETHICAL CONSIDERATIONS

Ethical considerations encompass all aspects of life, promoting fairness, respect, and responsible research practices. Hintz and Dean (2020) indicated that the term “ethical considerations” refers to the idea that upholding moral principles and obtaining participants’ informed consent is crucial to preserving credibility and protecting the rights and welfare of study participants. Additionally, ethical considerations in research refer to the principles and practices that researchers must follow to ensure that their study is conducted in an ethical and responsible manner (Nafsi, 2023). Hasan (2021) argued that to preserve the integrity and legitimacy of the research process as well as the rights, dignity, and well-being of study participants, ethical concerns are crucial.

The approval to carry out the study first had to be granted by the institution where the researcher was registered. Therefore, the University of South Africa (UNISA), where the researcher was enrolled, the Faculty of Health Sciences Research Office, which oversees the School of Public Health, and the Deputy Registrar of the University where the study was conducted, all had to give the researcher permission to conduct the study.

1.9 TRUSTWORTHINESS

Kagiri (2023) explained that the concept of trustworthiness in research is crucial as it pertains to the credibility, transferability, dependability, and confirmability of research findings. Prosek and Gibson (2021) stated that, consequently, investigators might utilise various fundamental concepts and tactics to bolster the credibility of their research, which are elucidated next. Ahmed (2024) concurred with Kagiri (2023) in that a qualitative research study is considered trustworthy if it possesses the following qualities: credibility, transferability, dependability, and confirmability. These are the ways in which each element contributes to the overall trustworthiness (Lincoln & Guba, 1985): Credibility refers to the degree to which the conclusions of a qualitative investigation accurately

reflect the viewpoints and experiences of the participants (Riazi *et al.*, 2023). Riazi *et al.* (2023) argued that researchers employ approaches, including extended interaction, member verification, and data source or method triangulation, to bolster credibility and ensure the conclusions are solid. As a result, to establish credibility and foster trust between the researcher and participants, the researcher dedicated sufficient time to the research setting.

Transferability refers to the extent to which the results of a qualitative study can be applied in various contexts or with different populations (Stalmeijer, Brown, & O'Brien, 2024). By providing readers with comprehensive, in-depth explanations of the study setting, participants, and procedures for gathering and analysing data, researchers enhance transferability and enable readers to evaluate the applicability of the findings to their own situations. Naudet *et al*. (2024) defined dependability as the consistency and dependability of the outcomes throughout time and among different researchers. Naudet *et al.* (2024) further stated that to increase dependability, researchers should make sure that all aspects of their research processes, including data collection, analysis, and interpretation, are clearly documented. Ahmed (2024) posited that they should also employ strategies such as audit trails and peer debriefing to contribute to the study's rigour. The online questionnaire, the procedures followed, the methods used, and the relationship forged between the participants are transparent sources of evidence in this study. Utilising instances of the transcripts of the interviews and discussions, the researcher demonstrated this presence. In this research, the use of examples from transcripts of interviews and conversations enhances the study's dependability and trustworthiness by offering clear, consistent, and thoroughly documented proof of conclusions. It encourages methodological rigour, facilitates peer review and verification, strengthens trustworthiness through participant validation, and provides the study's conclusions with rich contextualisation and depth (Aguinis, 2023). In the end, utilising this method guarantees that the research's interpretations and results are solid, reliable, and trustworthy.

Confirmability refers to the degree to which the findings are impartial and objective, meaning that the biases or assumptions of the researchers have not significantly influenced them (Stanford, 2024). By being reflexive throughout the study process, admitting their own prejudices and presumptions, and employing methods such as member checking and peer review to authenticate the results, researchers can enhance the confirmability of their findings.

1.10 CLARIFICATION OF CONCEPTS

The key concepts in the study are outlined and explained below.

Artificial Intelligence**:** AI is the process through which technology, particularly computer systems, may replicate human intellectual functions (Kong & Yang, 2024). Kong and Yang (2024) mentioned that among these processes are learning (the act of gaining knowledge and applying rules to it), reasoning (the application of rules to reach estimates or conclusions), and self-correction. Jaboob *et al.* (2024) argued that AI is a broad field with many subfields, including robotics, computer vision, machine learning, natural language processing, and expert systems. Jaboob *et al.* (2024) further argued that these subfields all strive to make robots capable of doing activities that normally require human intellect. Mubarik and Khan (2024) stated that AI technologies are disrupting various sectors and transforming the way people live and work across multiple domains, including healthcare, finance, transportation, education, and entertainment.

Generative AI**:** Sandhu *et al.* (2024) mentioned that generative Artificial Intelligence (AI) refers to a type of AI system that can create new information, such as text, graphics, or even synthetic data, by learning patterns from current data. Clark (2024) argued that generative AI can help students learn independently by giving tailored feedback and guided learning routes. This enables students to learn at their own pace and based on

their specific needs. AI provides instant access to valuable insights and information, enhancing the efficiency of learning and teaching processes (Kaswan *et al*., 2024).

Higher Education (HE): A university, college, or other post-secondary institution's level of education is referred to as higher education. Bachelor's degrees, postgraduate certificates, diplomas, honours, master's, and doctorates are among the degrees that are awarded for undergraduate, graduate, and professional studies (Skolnik, 2022). HE is essential for developing critical thinking, inventiveness, and research abilities in addition to helping people get ready for advanced professional positions and making a positive impact on society through research, education, and volunteer work (Bangun & Pragholapati, 2021).

School of Public Health**:** The School of Public Health is a School within the Faculty of Health Sciences. It provides a variety of postgraduate programmes, including the Master of Public Health (MPH) and research degrees. The School of Public Health offers courses in epidemiology and biostatistics, health policy and systems, occupational and environmental health, maternal and child health, social and behavioural change communication, rural health, and health economics, among other fields. The School of Public Health is located in South Africa and makes a substantial contribution to public health education, training, and research in South Africa and throughout Africa. Winter and Olivia (2024) posited that addressing public health issues by research, teaching, and community involvement is the mission of a School of Public Health. Gonzalez-Argote and Castillo-González (2024) mentioned that public health, epidemiology, health promotion, strengthening health systems, and related subjects are among the many undergraduate and graduate degrees it offers. The institution where the study was conducted is renowned for its contributions to capacity building, policy formation, and public health research both inside and outside of South Africa (Mosia, 2024).

1.11 CHAPTER DIVISION

This section provides a summary of each study chapter, summarising the information included in each chapter.

Chapter One: Orientation and Background

This introductory chapter provides a general overview of the research, including the research topic, research questions, and research goals. The research design, paradigm, approach, and research type were introduced. The study methods, such as participant selection, data collection, and data analysis, as well as key concepts, were covered. This chapter further addresses ethical measures, trustworthiness, and chapter clarification. In conclusion, the “Orientation and Background“ chapter is vital for providing the basis for the reader, ensuring they have the necessary background information, context, and understanding to follow the rest of the document.

Chapter Two: Theoretical Framework

This chapter discusses the study’s theoretical framework, which includes connectivism and the TAM. The chapter starts with a brief description of connectivism, which emphasises the role of networks and connections in learning in this study. The second theory underpinning this study is the TAM as it provides a valuable framework for understanding the psychological factors that influence individuals’ acceptance of technology. The strengths, related assumptions and limitations of these theories will be highlighted. An analysis of these theories will lead to a discussion on how learning should be understood in the context of this study.

Chapter Three: Literature Review

This chapter looks at the literature and covers relevant aspects, including how AI applications like AI are becoming increasingly popular in education in the twenty-first

century. The important part of the thesis that guides the research design and places the study in the larger academic conversation will be covered in this chapter. More clarification on what is known, what is unknown, and how the effort advances understanding of the subject is provided in this chapter. This chapter also reviews literature on the benefits and limitations of adopting AI in education. Furthermore, this chapter explores student perspectives of AI-driven educational tools, their impact on student interaction, and emerging AI technologies and their prospective impact on higher education.

Chapter Four: Research Methodology

The research design and methods are presented in this chapter. The research paradigm used and the research strategy appropriate for the study are described before the design and methods. After that, the research explains the research site, sampling techniques, and data collection and analysis protocols. Together with the flaws of the chosen design and procedures, the rationale for their selection is also given. The chapter then describes the steps the researcher used to guarantee the study's trustworthiness. The study considers ethical factors, starting with obtaining ethical approval from the participating institutions and abiding by the rules around the use of human subjects.

Chapter Five: Findings and Discussion

This crucial chapter in the thesis provides an overview of the research problem by presenting, interpreting, and discussing the study's findings. This chapter will cover the analysis and interpretation of the information gathered throughout the investigation. The data will be analysed for themes, patterns, or emerging trends. Discovering important findings pertinent to the research questions or aims may entail coding, categorising, and summarising the data. The findings of the study, as determined by the data analysis, are presented in this chapter. The findings are presented in a structured manner, frequently arranged in accordance with the themes or research topics found during analysis. A

thorough interpretation and analysis of the findings with respect to the study questions, theoretical framework, and body of current literature are given in the discussion section.

Chapter Six: Summary, Conclusions, and Recommendations

The chapter includes a synthesis of the study's findings, a summary of the literature and the empirical study. Additionally, this chapter will act as the conclusion component of this study, summarising the findings and addressing the research questions raised in Chapter 1. The chapter will also present and discuss a framework established based on the study's findings, explaining how the framework combines the data and gives a fresh perspective or solution. In addition, the chapter outlines the study's limitations, emphasising potential issues that could arise from the investigation. The study presents a conceptual framework for improving educational procedures will be made based on the study's findings higher education institutions and major stakeholders, specifically with respect to AI uses in education. This chapter will discuss the findings' importance and how they may affect theory, practice, policy, or future research. This chapter's findings will also be compared to those of previous research, with a focus on highlighting similarities and discrepancies as well as offering fresh perspectives in the area. Additionally, suggestions for more research are provided.

1.12 CHAPTER SUMMARY

This chapter presented an overview of the qualitative study on student experiences of the integration of AI in public health studies in higher education in South Africa**.** This chapter provided the background information and important topics that form the foundation of this study as well as the reasons why this research is important**.** The research problem was presented, along with the necessity of determining how AI is incorporated into public health studies. This was followed by the research questions and the study's aim and objectives that led to the inquiry. The chapter also included an introduction to the research design, which detailed the research design and methods. Ethical considerations for the

study were also discussed. This chapter also described the procedures for participant sampling and selection as well as how relevant data were gathered and evaluated to answer the study question. Throughout history, technology has evolved, transforming the delivery of education and influencing how students learn and teachers educate. As a result, as generative AI emerges and students increasingly use AI tools in their learning, it is critical to assess their experiences with AI integration in education. Finally, the study's key terms were defined, followed by an overview of the thesis's structure.

The next chapter presents selected theories that guided the theoretical framework of the study.

CHAPTER 2: THEORETICAL FRAMEWORK

2.1 INTRODUCTION

The previous chapter provided an overview of the study, including the introduction, background, research problem, main question, sub-questions, and methodology. The current chapter introduces the theoretical framework that guided this research. The two theories that comprise the theoretical framework are the TAM and connectivism. It's important to emphasise how theory affects practice and research and, where feasible, how theory can guide South African higher education students to integrate AI into their studies and how higher education institutions themselves might benefit from or enhance it. Theorising involves applying critical and creative approaches to a wide range of circumstances utilising theoretical frameworks. In this theoretical framework, the TAM was utilised to investigate how students' attitudes towards utilising (ATU) AI tools, perceived ease of use (PEOU), and perceived usefulness (PU) affect their behavioural intention (BI) to use these tools in educational contexts. Since TAM has received widespread validation in the field of technology adoption research, it provides a solid framework for investigating these links. The chapter further examines the direct and indirect effects of students' attitudes regarding AI on their actual usage behaviour (actual system use, AU) by including three crucial TAM elements. Utilising connectivism as a lens, this study examined how AI tools assist students in building, organising, and maintaining learning networks. Different from the TAM's emphasis on PU and PEOU, connectivism emphasises the role of technology in education. This research explored students' perceptions of AI as a networked learning facilitator as well as a tool for academic tasks supported by connectivism. Ugwu (2024) stated that the TAM and Connectivism are two theories that complement one another by focusing on distinct yet related facets of technology adoption and education.

2.2 THEORETICAL FRAMEWORK

A theoretical framework, which outlines the theories or concepts that underlie research, serves as the basis for a study and a guide for research by defining the aspects, relationships, and fundamental concepts that serve as the foundation for the study (Dehalwar, 2024). Dehalwar (2024) further outlined the fundamental theories or notions that a study uses to address the topic, scrutinise the information, and construe the findings. The researcher ensured that this study is based on current knowledge by laying the groundwork, which helped explain how and why things happen in the setting of the investigation. According to Sadeghi and Goerlandt (2023), a theoretical framework plays a crucial role in the study, as it establishes the framework for the investigation, guides the methodology, and facilitates the interpretation of the results. Dehalwar (2024) and Sutaphan and Yuenyong (2019) concur that theoretical frameworks provide a solid basis for both scholarly research and practical implementations. As a result, a theoretical framework may include one or more theories; the selection of these theories relies on the objectives, the research question, and the intricacy of the phenomenon under investigation. Lo (2023) mentioned that the framework selection should align with the goals and research question. By providing a framework for the study, it is feasible to interpret the findings in a way that directly answers the research question, guaranteeing that the insights make a significant contribution to describing the theoretical or practical consequences, such as enhancing AI integration in educational practices. Lo (2023) further argued that a solid foundation for understanding and assessing students' impressions of utilising AI can be found in several academic frameworks. This strong basis, therefore, contributes value by ensuring that the study's analysis is methodologically sound and that its results will be situated within scholarly discussions on AI in education. As a result, the study's findings will be more credible if they are supported by a recognised framework.

Two theories and models that scientists use in educational technology studies are connectivism and the TAM. The researcher selected these because of their complementing qualities and ability to cover different but connected subject areas. Choosing the right theories for this research, which examines the integration of AI in higher education, especially in the field of public health studies, helps to offer an organised method for examining the intricate relationships between technology, learning, and human behaviour. As a result, choosing the TAM and connectivism for this study allowed the researcher to explore technology adoption as well as its educational influence.

According to Lau and Guo (2023), researchers can develop a thorough knowledge of the advantages, drawbacks, and implications of students utilising AI for learning by embracing learning theories. This study offers the potential to create well-informed recommendations for the integration of AI in HE that are in line with student desires and educational goals, because the TAM and connectivism provide a complete grasp of the technology's consequences in education.

Lau and Guo (2023) state that to inform pedagogical strategies and instructional design in the context of AI integration in education, connectivism and the TAM can guide research into the cognitive, social, and behavioural aspects of students' interactions with AI tools. This argument facilitates a comprehensive and multifaceted examination of students' interactions with AI, which is crucial for developing supportive and relevant teaching practices. Educators and instructional designers can better understand not just if students utilise AI, but also how and why they do so, the cognitive and social advantages it provides, and any obstacles by combining the TAM with connectivism. By understanding these facets, educators can make informed choices to promote meaningful AI interactions and facilitate successful integration into the classroom. Thus, by utilising these two theories, this study sought to shed light on how students interact with AI and

offer a deeper understanding of that interaction, thereby providing knowledge that can inform more effective methods of instruction.

The two theories also offer different yet complementary lenses that aid in organising and directing the study process. Connectivism and the TAM form the foundation of this study. After discussing the theoretical framework, the two theories are discussed in more detail next.

2.2.1 The Technology Acceptance Model

The TAM was developed by Fred Davis in 1986 for his doctoral dissertation, and since then, information systems researchers have extensively employed the TAM to understand and forecast users' acceptance and adoption of new technologies (Davis & Granić, 2024). The TAM presents a solid platform for investigating how and why users adopt technology (Davis, 1998). Consequently, TAM helps to clarify the complexity of utilising AI in education by emphasising the perceived benefits and simplicity of use, hence promoting the effective acceptance and utilisation of AI technology in educational contexts.

The TAM highlights perceived ease of use and perceived usefulness as the primary elements affecting technology adoption (Gumasing, 2025). Researchers can understand the elements that help or hinder students' adoption of AI technologies by examining the constructs of perceived usefulness and perceived ease of use. By investigating how students perceive, accept, and use AI tools, the study can find techniques that improve learning experiences, engagement, and academic outcomes while aligning with institutional goals (Jeilani & Abubakar, 2025). The literature by Lau and Gu (2023) emphasises the significance of applicable theoretical frameworks in guiding research, providing insights into how AI affects learning, and informing educators and educational institutions on how to integrate AI into the classroom. The TAM outlines factors that drive AI technology acceptability and effectiveness for this study, whereas connectivism

explains how these tools can strengthen learning networks and enable continuous knowledge development.

2.2.1.1 Purpose of the Theory

The purpose of Davis's model was to explain user behaviour with reference to the uptake and use of technology (Davis & Granić, 2024). Faqih and Jaradat (2021) posited that creating a foundation for understanding the factors that influence technology adoption in a variety of settings, such as workplace and educational environments, was the main goal.

2.2.1.2 A General Overview of TAM

In the TAM, two crucial elements impact a person's choice to embrace and utilise a technology (Yadegari *et al.*, 2024). PU is the extent to which an individual thinks that utilising a specific technology or system will improve their productivity. The degree to which students perceive AI tools and applications as enhancing their learning outcomes and study efficiency can be interpreted as perceived usefulness in the context of AI integration in public health studies (Esmaeilzadeh, 2020). PEOU measures how much a person thinks utilising a specific technology or system will be effortless (Goh & Wen, 2021). Goh and Wen (2021) further argued that students' evaluation of how easy it is to use AI technologies in their coursework and research activities is a key component of perceived ease of use. PU and PEOU are the two primary components of the TAM; however, over time, other elements that potentially influence technology adoption have been added to the model (Bano & Siddiqui, 2024). Kelly *et al.* (2023) indicated that the user's overall emotive response to utilising technology is called their ATU. Adopting a positive outlook can enhance students' willingness to connect with AI tools (Kelly *et al.*, 2023). In this study context, students who approach AI tools with a positive mindset are more likely to engage and use these technologies. Humida *et al.* (2022) stated that one

measure of a user's intention to use technology in the future is called behavioural intention to use (BI). In this study context, BI refers to students' declared willingness or plan to use AI tools in their future learning experiences. BI asks not just if students have already utilised the technology, but also if they plan to incorporate it into their study habits, assignments, and research activities. AlGerafi *et al.* (2023) noted that one of the most significant factors in determining whether a user will interact with a system is BI technology. AlGerafi *et al.* (2023) argued that BI is a term used to describe a user's future intention or desire to accept and use technology.

2.2.1.3 TAM Application to This Study

Ayanwale and Ndlovu (2024) stated that students are more likely to investigate and embrace AI when they believe technology is user-friendly. AlGerafi *et al*. (2023) further posited that students may feel more at ease and confident utilising an AI tool for their studies if it has an easy-to-use interface.

PU, PEOU, and ATU are three variables that can impact students' BI to use AI products and are discussed below:

With PU, students are more likely to incorporate AI tools into their learning techniques if they believe these tools can enhance learning outcomes (Davis, 1989). Consequently, students may view AI technologies more favourably and be more inclined to use them if they provide tailored learning experiences. Ayanwale and Ndlovu (2024) argued that with PEOU, users are more likely to adopt technologies if they perceive them as simple to use. For students utilising AI technologies for the first time, this is especially true (Ayanwale & Ndlovu, 2024). On the other hand, a user's overall emotive response to technology use is represented by ATU. According to Ismatullaev and Kim (2024), the ATU construct expresses how a person perceives interacting with a system, whether positively or negatively. Chatterjee and Bhattacharjee (2020) mentioned that a favourable attitude

towards utilising these technologies is a strong predictor of the adoption of AI tools for students. According to Naseri and Abdullah (2024), encouraging a positive outlook can increase readiness to try new things and increase involvement. Students' attitudes toward adopting AI improve when they believe technology can be useful, intuitive, and advantageous for learning (Holmes, 2020). Furthermore, students are more likely to embrace and interact with AI tools if they feel utilising them will improve their academic achievement (Hazaimeh & Al-Ansi, 2024). This is because they will probably have a positive attitude about these technologies. Scholars such as Alieto *et al.* (2024) have demonstrated that students who are more open to technological innovations tend to gain more from them; therefore, it is imperative to foster the development of these attitudes.

The final dependent variable in the TAM, AU, measures how frequently students use AI tools for their studies, what kinds of academic tasks they accomplish with AI (e.g. writing assistance, reading summarisation, language improvement, and study material creation), and how much AI has become a standard part of their academic lives (Luc Ha & Nguyen, 2025). Therefore, AU makes a direct connection to students' real-world experiences by demonstrating not only if they want to use AI but also how they do so, what obstacles they face, and how AI affects their learning objectives (George, 2023). An individual's intention to adopt a specific IT is influenced by PU and PEOU (Wandira *et al.*, 2024). PEOU refers to how much a prospective user thinks or feels that utilising that IT system will be effortless (Basuki *et al.*, 2022). This idea represents the extent to which a user thinks that utilising a particular IT system, such as AI technologies in education, will improve their performance or results. A high degree of PU for students could indicate that they believe AI will help them study more effectively, understand concepts better, or be more productive. As shown in Figure 2.1, students' PU and simplicity of use of AI favourably influence their inclination to employ it in learning.

As students experiment with new technologies to improve their learning, the use of AI tools in education is becoming more and more crucial (Chen *et al.,* 2024). Students are

more inclined to use an AI tool if they believe it to be user-friendly and intuitive. PEOU also shapes PU, which has an indirect effect in addition to its direct influence on intention to use. These factors then influence students' BI. The diagram below illustrates the relationships between the main elements of the TAM, highlighting how BI and AU are influenced by factors such as PU, PEOU, and ATU (Chatterjee & Bhattacharjee, 2020).

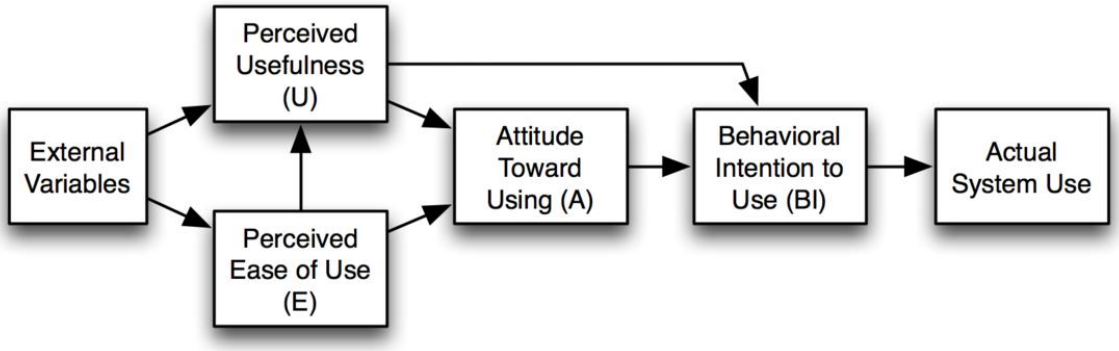

Figure 2.1: Illustration of the TAM (Source: Miller & Khera, 2010)

The TAM, which offers a proven theoretical framework for investigating how and why students choose and use AI tools in HE, is extremely pertinent to this study. With the emphasis on students utilising AI for academic tasks such as writing assistance, content summarisation, and study material creation, the TAM enables the examination of important elements like PU and PEOU, both of which affect students' acceptance and actual use of technology. Another theory, the Unified Theory of Acceptance and Use of Technology (UTAUT), expands on the ideas of the TAM by incorporating other aspects such as social impact and enabling environments (Ursavaş, 2022). However, this study focused on the TAM since it provides a well-established framework for investigating students' evaluations of the usefulness and usability of AI in learning. By focusing on TAM, the study examined how these underlying beliefs affect students' intentions to adopt AI, noting that UTAUT may offer a broader perspective for future research.

While UTAUT and its extensions, which incorporate more expansive constructs like social influence and facilitating conditions, are better suited to organisational contexts, the TAM was used as the framework for the study because it adequately addresses students' acceptance and use of AI tools in HE. Venkatesh *et al.* (2003) introduced the UTAUT, which expands on TAM by adding more constructs like performance expectancy, facilitating conditions, and social influence. Venkatesh and Bala (2008) extended TAM to examine how faculty and students' acceptance of learning management systems (LMS) and other educational technology in HE is influenced by perceived usefulness and ease of use. Similarly, Teo (2011) used the TAM to examine the elements influencing teachers' adoption of digital technologies in the classroom, showing that attitudes regarding technology have a significant influence on the adoption process. Alharbi and Drew (2014) used the TAM in a different study to identify the elements that influence students' acceptance of e-learning platforms. Accordingly, students are more likely to have a positive opinion of the system in online learning, which will improve engagement and adoption if they find it dependable and user-friendly.

These TAM uses highlight how adaptable it is in evaluating technology adoption across a range of HE contexts, which is consistent with the goal of the current research, which is to comprehend AI acceptability in education. The TAM supports this study on how opinions about AI's usefulness and usability affect its uptake, giving this research a strong foundation. For several key reasons, this model was particularly relevant to the research on the application of AI in this study**.** Within the framework of this study, the TAM's capacity to identify obstacles to technology adoption is one of its most important contributions. Possible obstacles to AI in public health may include opposition to altering current procedures, mistrust of AI-driven decisions, or concerns about the technology's complexity (Verma *et al.*, 2020). With its organised method for assessing user attitudes and beliefs, the TAM aids in identifying these obstacles. This could entail creating AI solutions for educational settings that offer insights based on each student's achievement,

facilitate effective study techniques, or give personalised feedback. AI becomes a useful tool for education by developing these capabilities, increasing the likelihood that both students and teachers will use it.

2.2.1.4 Benefits of the TAM for This Study

The TAM has several advantages when utilised in a study looking into the usage of AI in HE in South Africa. Burgos (2024) posited that the TAM assists in identifying potential barriers to adoption, such as aversion to change, ethical questions, or doubts about the dependability of AI. Therefore, understanding these obstacles enables focused measures to be taken to overcome them. The TAM pinpoints elements that encourage adoption. Students are more likely to adopt AI tools if they perceive them as helpful and user-friendly. Jackson and Allen (2024) stated that through the identification of key enablers, the TAM contributes to the development of approaches that highlight the advantages and practicality of AI, ultimately promoting broader adoption. The TAM is well recognised in the literature and has been proven to work in a variety of settings and technological environments. Its empirical validation offers a strong basis for forecasting the adoption of technology in novel contexts, such as AI in public health studies (Herath & Mittal, 2022). Researchers can rely on a substantial collection of facts to bolster their conclusions and forecasts regarding the adoption of AI by utilising the TAM (Naidoo, 2023). Alzebda and Matar (2024) noted that the TAM provides a fundamental framework, but it can also be adapted to fit various situations and rapidly changing technological landscapes. By incorporating these elements into the TAM, the study hoped to gather opinions regarding the dependability and moral implications of AI in public health studies. The TAM framework was used as a theoretical lens to illustrate how AI technologies match with current efforts in education. It was pertinent to this study because it investigates users' perceptions, acceptability, and actual usage of technology, factors critical to understanding how students interact with AI in education. Although adopting the TAM for

this study has advantages, some drawbacks should be considered. These are covered in more detail below.

2.2.1.5 Restrictions of the TAM for This Study

Putting the results in perspective and correcting any potential flaws in the research requires an understanding of the constraints discussed below. Dhirani *et al.* (2023) posited that data privacy, unfairness, and transparency in AI systems are a few ethical issues that the TAM does not specifically address. These issues are important to students and can potentially affect technology adoption and use. The TAM does not address elements such as infrastructure, policy, and organisational support (Hernandez, 2024). Thus, the effective integration of AI technologies into public health studies may depend on several factors. Abdullah and Almaqtari (2024) mentioned that the perceived usefulness and ease of use of AI technology may change as it develops, and the TAM's static nature may not accurately reflect these shifting perceptions. Lu (2024) stated that the emotional and psychological aspects of technology adoption, which the TAM may affect, are not specifically addressed. User feelings, such as excitement, scepticism, or anxiety, about AI technologies can be important in AI education (Lu, 2024). Excitement may promote receptivity to novel AI techniques, increasing student and teacher uptake and engagement. Scepticism or fear, however, may prevent people from fully embracing AI's promise, which could result in resistance or underuse. Thus, it is essential to understand these emotional reactions in this study, as they may impact the effectiveness of AI technologies and their reception.

2.2.2 Connectivism

The second theory, connectivism, provides a recent paradigm for understanding learning in the digital age, particularly when AI technology is involved. George Siemens and Stephen Downes first presented connectivism in 2005 (Downes & Siemens, 2005). The

authors further argued that since then, connectivism has been applied in educational settings to inform the design of online learning environments that promote connections with diverse information sources, promote peer collaboration, and encourage self-directed learning. This section examines the core concepts and applications of connectivism as a theory of learning, particularly in technologically enhanced and networked situations. It further discusses learning through technological connections and networks, the theory's founders and historical background, and looks at the applicability of connectivism to this study. Lastly, it discusses its advantages and disadvantages, offering a clear path to comprehension that adds to the conversation on connectivism as a whole.

2.2.2.1 Learning Through Networks and Technological Connections

Connectivism holds that knowledge is dispersed throughout networks and that learning entails creating, traversing, and connecting these networks, with technology serving as a key tool to make this possible (Downes & Siemens, 2014). Knowledge is dynamic and ever-evolving in the digital era. Connectivism posits that for students to remain current with advancements in their profession, they must continually adapt (Vokwana *et al.*, 2024). In line with Vokwana *et al*. (2024), Kaswan *et al.* (2024) assert that for students to remain up to date with advancements in their field, they must continually adapt. This is crucial when considering the ways in which AI is implemented in educational settings, where technology facilitates individualised learning plans, collaboration spaces, and information access (Kaswan *et al.* (2024). In addition to serving as a node within the learning network, AI also improves students' capacity for productive and efficient communication with other network nodes (Vokwana *et al.* 2024). Connectivism maintains that as knowledge is scattered throughout a network of links, learning is the process of establishing and navigating these connections (Downes & Siemens, 2014). In this theory, students need to be able to study continuously and adjust to changes in their networks to stay up to date with new advancements. Connectivism relies heavily on technology to

facilitate the formation and maintenance of networks (Vokwana *et al.*, 2024). Learning management systems, social media, and other digital platforms are examples of tools that facilitate connections between students and knowledge sources (Vokwana *et al.*, 2024).

Bordag (2007) argued that the principle of connectivism is important when employing AI tools for quick feedback through learning since it represents and processes data in a fundamentally different way than symbolic techniques, which relate atomic lexical-level features through discrete structures. As mentioned by Bordag (2007), the connectivist principles are vital for leveraging AI technologies to provide timely and relevant learning feedback. One illustration of connectivism principles is the use of AI tools, such as Grammarly and ChatGPT, by students to connect with extensive knowledge bases outside the classroom and receive instant feedback. In contrast to conventional, rule-based symbolic techniques, which are predicated on limited, predefined connections and permanent structures, connectivism promotes a networked approach in which knowledge is created through dynamic, interconnected patterns (Weber, 2017). Bickley and Torgler (2023) stated that to assess a variety of information sources and provide insights responsive to the needs of students, AI systems that adhere to connectivism principles handle data in ways that are adaptive and context-sensitive. This method not only provides prompt feedback but also makes learning deeper and more integrated, which encourages ongoing development and introspection, two things that are crucial in an educational environment that is changing quickly. Consequently, connectivism is thought to be a framework that may explain complicated learning in the digital era, particularly considering the dynamic nature of digital social contexts.

Dziubaniuk *et al.* (2023) argued that in this age, learning occurs increasingly within interconnected networks, with knowledge being created, shared, and disseminated via digital platforms. Dziubaniuk *et al.* (2023) further noted that the trend toward networked learning, facilitated by tools and platforms that provide easy access to and sharing of information, reflects broader developments in the technological landscape. Peter and

Ogunlade (2024) noted that in the digital age, their work illustrates how connectivity and the ability to access vast information networks impact learning. Therefore, connectivism not only acknowledges the importance of technology in education but also makes it clear that these tools are necessary for knowledge acquisition in challenging, real-world situations.

The following section presents the concepts and historical background of the theory's founders.

2.2.2.2 Historical Context and Founders of the Theory

Khaldi (2024) cited that connectivism, a learning theory created by George Siemens and Stephen Downes in the early 2000s, arose to meet the demands of modern education. Connectivism has historically arisen as an evolution in learning theories that reflects technological advances in information access and the nature of learning. According to Downes (2023), Siemens emphasised that in a constantly evolving information ecosystem, the ability to locate, connect, and use knowledge is crucial. Plueger (2024) noted that by developing the concept that knowledge is disseminated across a network and that learning occurs through active engagement with these networks, Downes made a significant contribution to the advancement of connectivism.

As digital technology advanced quickly and knowledge networks became more sophisticated, connectivism evolved as a reaction. As a result, connectivism advocates for a learner-centred environment in which individuals connect to learning communities to actively engage with knowledge and build important 21st-century skills, including information and ICT literacy (Miller, 2009).

2.2.2.3 Connectivism's Relevance in This Study

Students who utilise AI to study must be able to traverse and establish social networks utilising technology and be connected to digital networks. Thus, in this theory, students' experiences with the integration of AI in education clearly indicate whether or not they were able to promote the acquisition of new knowledge and skills and expand their networking abilities. Nguyen (2024) mentioned that this theory contends that learning is a networked phenomenon influenced by socialisation and technology, highlighting the significance of connections and networks in the acquisition of knowledge. With the use of AI technology, educational networks may be built and strengthened for students. This approach emphasises the significance of utilising modern technologies, online resources, and collaborative learning environments to support education and skill development. In line with the connectivist theory, students interacted with digital learning environments, including online discussion forums, academic social platforms, learning management systems, and professional networks, which enabled them to collaborate with experts and peers, receive personalised recommendations, and access relevant educational resources. Ahmad (2024) posited that connectivism is suitable for dynamic online learning settings, as it is characterised by features such as autonomy, connectivity, diversity, and openness, aligning with the notion that knowledge is composed of networks and links. By examining student interactions and making recommendations for connections that can enhance learning, AI can help develop effective learning networks. Uzumcu and Acilmis (2024) argued that it is viewed as a theory that can be applied to various sectors, including science, education, and healthcare, where technology facilitates interactions and generates vast volumes of data. Uzumcu and Acilmis (2024) emphasised that this theory is broadly applicable to fields where technology facilitates rich interactions and produces vast amounts of data, such as science, education, and healthcare. This adaptability highlights AI's capacity to support data-driven insights and enable intricate learning interactions, which is particularly pertinent in the context of public health education. By incorporating this theory into public health education, a deeper understanding can be

gained of how AI might enhance learning opportunities by assisting students in interacting with vast information networks and successfully applying their knowledge in practical healthcare situations. Students can choose their own learning paths, which aligns with connectivism concepts (Uzumcu & Acilmis, 2024). The theory of connectivism emphasises the importance of networks and technological breakthroughs in the learning process, which expands upon the conventional framework of learning (Peter & Ogunlade, 2024).

2.2.2.4 Networked Learning in AI-supported Education

Figure 2.2 below provides an overview of connectivism. The illustration captures the central tenet of connectivism: learning is a dynamic, networked process that includes interactions between students, content, technologies, and environments. With the use of AI technologies, students may access and engage with knowledge more effectively and cooperatively. The figure below illustrates the fundamental components of a connectivism learning environment, emphasising how learning occurs through networks of people, content, technologies, and context. Each component plays an important part in shaping the learning experience, as detailed below.

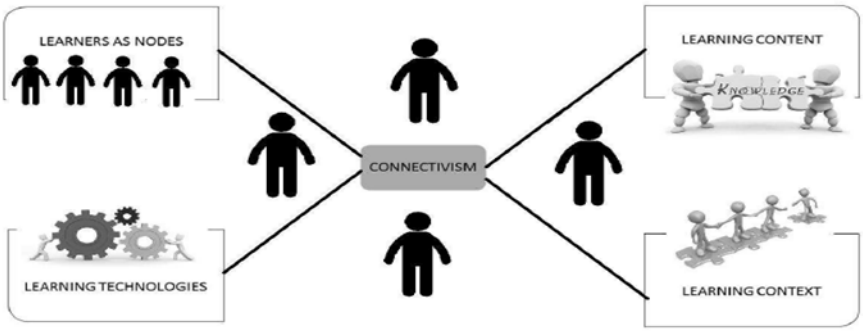

Figure 2.0.1: An Overview of Connectivism (Source: Chetty, 2013)

As nodes, students actively participate in a network of knowledge. As a result, students act as nodes that link to different information sources, participate in conversations, exchange content, and interpret interactions (Sharma *et al.*, 2024). Additionally, learning occurs through interaction with others and the larger information ecosystem rather than being isolated in this element of students as nodes (Wang, 2021).

Learning content refers to the knowledge, concepts, and skills that are acquired and conveyed. Hargreaves (2024) reported that formal sources, such as lectures and course materials, as well as informal ones, including blogs, podcasts, and AI-generated comments, can provide learning content. Students must assess and sift through the ever-changing and dynamic content. Hidalgo, Rivera, and Delgadillo (2019) stated that learning technologies are platforms and tools that facilitate learning (e.g. MOOCs, discussion forums, social media, LMSs like Moodle and Canvas, and AI tools). Roberts (2025) defined learning technologies as tools that facilitate the distribution of materials, communication, teamwork, and access to a variety of knowledge. By connecting students to content, these technologies increase accessibility and interactivity in the learning process. An environment or setting that facilitates learning is known as learning content (e.g. online, blended, distant education). Context influences how learning occurs and can include institutional, cultural, or individual elements. Understanding the context is important because it facilitates the creation of meaningful learning experiences that are relevant to the students' needs (Bustomi *et al.*, 2025).

Mukherjee (2024) stated that through the integration of these elements, connectivism emphasises the importance of connections in improving educational outcomes and offers a strong framework for comprehending how students interact with AI technology in a learning environment.

Having examined the relevance of this theory and provided an overview of the theory, there are also benefits and drawbacks to adopting it, as discussed below.

2.2.2.5 Benefits of Connectivism Theory

In a world of information that is always changing, the theory encourages lifelong learning and places a strong emphasis on developing the ability to locate, assess, and apply knowledge (Mukhlisa *et al.*, 2024). Hussein (2021) posited that through its emphasis on networks and social relationships, connectivism encourages group learning, allowing students to benefit from the knowledge and viewpoints of others. Hussein (2021) further stated that with its emphasis on autonomy, connectivism promotes independence by letting students direct their own education and concentrate on subjects that are most important to them. The notion promotes the development of digital literacy abilities, including the ability to use digital tools efficiently, navigate information, and interact with online networks (Khan *et al.*, 2022).

Despite the benefits of connectivism, there are certain limitations that are discussed below.

2.2.2.6 Limitations of Connectivism Theory

Connectivism, which relies largely on digital tools and networks, may exclude individuals who do not have access to technology or who have inadequate digital abilities, adding to a digital divide (Hussein, 2021). Kutto and Erastus (2024) posited that traditional examinations are frequently difficult to implement within connectivism frameworks, making it impossible to assess learning outcomes. Connectivism may prioritise connectedness and information flow over a thorough understanding of fundamental knowledge, potentially resulting in superficial learning (Somani *et al.*, 2023. Despite these seeming flaws or limitations, connectivism was nevertheless relevant to this research because it offers a useful framework for comprehending how students move through, filter, and apply information in intricate, technologically advanced learning contexts.

Almutairi (2023) posited that connectivism has drawn a lot of criticism despite its innovative approach. Connectivism's lack of theoretical foundation and empirical support is one of the main criticisms (Alam, 2023). Connectivism's detractors contend that it fails to distinguish itself from other social learning theories that already exist, such as social constructivism, which similarly emphasises group knowledge creation (Almutairi, 2023). Furthermore, proponents of connectivism contend that learning is more about navigating networks than picking up isolated facts, but detractors think this undervalues the significance of fundamental knowledge and abilities (Frink-Levenhagen, 2021). Others argue that connectivism lacks the empirical support and scientific rigour of well-established theories, raising doubts about whether it is a genuine learning theory or merely a pedagogical framework (Frink-Levenhagen, 2021). Additionally, some contend that connectivism overemphasises technology while possibly undervaluing the importance of conventional, in-person contacts in the learning process (Papageorgiou, 2022). However, connectivism has had a significant impact, particularly in online and digital learning environments, leading to continuous discussion and improvement of its ideas.

2.3 CHAPTER SUMMARY

The theoretical framework developed by previous researchers to understand how and why people adopt or reject new technologies in the digital era is described in this chapter, providing the basis, guidance, and rationale for the investigation. The theoretical framework further looked at how students use online networks and digital tools to build knowledge in HE. The two theories, the TAM and connectivism, that direct students' experiences with AI integration in public health courses in South African HE, were covered in this chapter. The chapter also provided a brief overview of the rationale for selecting the two theories deemed most suitable to guide the comprehension of the research. While empirical research was conducted to address the research questions, these theories help the study by providing a framework for comprehending and

interpreting the research findings. The historical context of the two theories was covered in this chapter. To ensure that the research instruments used in the study were properly chosen, considering the investigation, it was also crucial to explain the relevance of the chosen theories, as well as their benefits and limitations, to the study.

A review of previous research on studies related to or comparable to the topic of this study, carried out in Africa and other parts of the world, is presented in the next chapter.

CHAPTER 3: ARTIFICIAL INTELLIGENCE AND ITS IMPACT ON HIGHER EDUCATION

3.1 INTRODUCTION

The TAM and connectivism were covered in the previous chapter, which served as the theoretical framework and basis for comprehending the dynamics of technology usage and learning in this study. This chapter covers the literature review, covering the history of AI and its impact on HE in the context of this study. The capacities of HE institutions, as represented in the literature and policies, demand more consideration. Accordingly, this research focused on key aspects of AI, including generative AI, large language models (LLMs), machine learning (ML), and the origins and evolution of AI. The study also discusses AI's position in HE, its advantages and disadvantages, and how AI tools can be integrated into LMS. Ethical issues are also covered, such as privacy, equity, and academic integrity, in relation to the employment of AI in HE.

3.2 LITERATURE REVIEW

A literature review is a thorough overview and assessment of previous studies and academic works on a particular topic (Varsha *et al.*, 2024). Through the integration of prior findings, the identification of gaps, and the placement of new studies within the broader academic framework, the literature review thus lays the groundwork for future studies. A literature review identifies gaps or areas that require more investigation by examining previously reviewed literature (Varsha *et al.*, 2024). Summarising and combining pertinent studies, hypotheses, and discoveries offer an overview of the present level of knowledge on the topic. Kociatkiewicz and Kostera (2024) posited that the literature review demonstrates how the new research builds upon or extends earlier work by situating it within a broader academic framework. Thus, the literature review makes it clear how a new study builds upon, departs from, or supplements earlier research by

placing it within a larger academic framework. This ensures that the recently conducted study is understood in light of previously acquired knowledge and establishes its importance and relevance within the broader scholarly framework. Given the study's emphasis on AI in HE, a solid basis for discussing AI's contributions to educational openness and accessibility is established by first examining technology's historical role in DE. This shift from conventional DE tools to AI-powered systems demonstrates how technology is continually evolving educational opportunities, leading to more inclusive and flexible learning environments. The literature review, therefore, begins by examining how DE has been made possible by technology, which enables institutions to contact students remotely and offer educational materials that transcend physical boundaries.

3.2.1 The Role of Technology in Distance Education

The use of digital technologies to raise educational standards is currently of utmost importance. Ali (2020) argued that in Africa and worldwide, technology has revolutionised remote learning by closing gaps in accessibility, student involvement, and educational quality. Haleem, Javaid, Qadri, and Suman (2022) stated that technology plays a crucial role in DE by enhancing the educational process through various digital tools and platforms. These technologies encourage student participation and interaction, making instructional information easier to access (Haleem *et al.*, 2022). The integration of digital technology has transformed conventional teaching strategies, enhancing accessibility and efficacy (Simonson *et al.*, 2019). Simonson *et al.* (2019) stated that DE has been transformed by technology, which allows for lifelong learning, flexible learning options, and access to education beyond physical borders. Florjančič and Wiechetek (2022) posited that structured, distance coursework has been made possible by LMSs like Moodle, Blackboard, and Google Classroom, while live, interactive classrooms have been made possible by video conferencing platforms like Zoom and Microsoft Teams. Aithal and Maiya (2023) mentioned that Massive Open Online Courses (MOOCs) and open educational resources (OERs) are examples of resources that have made top-notch

education from universities available to students worldwide. Begazo *et al.* (2023) noted that technology has also increased access to education throughout Africa, albeit with certain challenges and adjustments. Some digital solutions are limited by the continent's differences in electricity, internet connectivity, and technology infrastructure. However, in many African nations where mobile networks are more accessible than fixed internet, mobile technology has played a crucial role in improving education (Begazo *et al.* 2023). Learning materials are now accessible even in remote locations, thanks to educational apps, SMS-based learning, and offline digital resources such as low-bandwidth apps and pre-loaded content on tablets (Reddy, 2021).

The most recent AI technologies, such as ChatGPT, which was introduced in November 2022, exemplify advances that influence modern learning settings, best exemplified by the application of AI in education (Grassini, 2023). Virtual assistants, automated grading systems, and adaptive learning platforms are just a few examples of AI technologies that are transforming conventional teaching methods. These technologies have the potential to enhance access to education for a diverse student body, streamline administrative procedures, and offer personalised learning experiences (Das *et al.*, 2025). By utilising AI's capabilities, educational institutions are addressing issues like inclusion and scalability while also increasing efficiency. Additional exploration of these applications will demonstrate the significant influence of AI on education in the future.

3.2.2 Artificial Intelligence in Education

The use of intelligent computer systems to enhance administrative, instructional, and learning processes is referred to as AI in education (Chen & Chen, 2020). AI in education has its origins in early cognitive science and computer science research conducted in the mid-20th century, when efforts were made to create systems that could mimic certain features of human reasoning (Cai *et al.*, 2021). LMS, adaptive testing, and intelligent

tutoring systems are examples of the educational technology that have developed over time (Kumar *et al.*, 2025).

Building on the historical evolution of AI in education over time, it is essential to clarify the differences between conventional uses of AI and more recent advancements in the field, particularly in generative artificial intelligence (GenAI). Therefore, there are significant differences between AI and GenAI. Mittal *et al.* (2024) stated that while generative AI can produce new content, like writing, graphics, or even simulations, based on learned patterns, traditional AI concentrates on data analysis and predictive or diagnostic tasks, such as suggesting educational materials or detecting children who are in danger. As reported by Lancaster (2025), a chatbot that composes an entire essay draft is an example of generative AI, whereas a recommendation system is a form of AI.

AI has the potential to revolutionise education. Consequently, AI can assist inclusive education by meeting a variety of demands, automating administrative activities, personalising learning experiences, giving real-time feedback, and improving learning scalability in both traditional and ODL settings (Singh *et al.*, 2025). Through data-driven insights, AI may enhance decision-making at the institutional level and foster curriculum innovation. However, this change also raises important issues regarding equity, data privacy, ethics, and the evolving role of educators (Khan, 2024).

Along with lesser-known technologies for content creation, personalised learning, and academic support, this section includes well-known AI tools such as ChatGPT, Copilot, MetaAI, SciSpace, Lumina, and Elicit under the umbrella of generative AI. Various AI technologies are transforming education in several ways, including interactive learning and personalised tutoring (Kaswan *et al.*, 2024).

AI can help teachers and students with diverse language backgrounds communicate and collaborate effectively. AI-powered accessibility solutions, such as text-to-speech and

speech recognition, can help students with disabilities by providing an alternative method of accessing course materials (Saini *et al*., 2024). According to George (2023), the basic architecture of AI enables it to comprehend and interpret natural language queries, allowing users to pose inquiries, look up information, and engage in conversations on various subjects. George (2023) argued that providing answers based on patterns and information learned during training can explain concepts, offer examples, and even facilitate problem-solving activities. The development of generative AI and LLM, as described in Chapter 3, Section 3.2.6, is the result of the integration of AI. Alipour *et al.* (2024) stated that LLMs, such as ChatGPT, are advanced types of AI that understand and generate human-like text based on the information received. Cheng (2024) mentioned that LLMs use deep learning techniques through transformer neural networks, notably transformer structures, to process and create texts. Over the last decade, LLMs have grown significantly, owing mostly to advances in deep learning methods, increases in computer power, and the availability of large datasets (Cheng, 2024). Models such as GPT (Generative Pre-trained Transformer) have undergone several iterations, with each version improving on the capabilities of the previous one (Moussa, 2024). AI is especially applicable in both in-person and remote learning settings because it can adjust to the needs of individual students, monitor their progress over time, and offer real-time assistance.

A broad overview of AI in education has been given in the discussion above, including its significant advancements and differences from generative AI. This was done to lay the groundwork for understanding the evolution of AI and its importance in education. Thus, a more thorough outline of AI's development and history will be provided in the sections that follow.

3.2.3 History and Development of AI

The application of AI technology in education is expanding rapidly as educational institutions seek to enhance the processes of instruction and learning (Garg, 2021). These technologies are not only impacting education and student interaction but also offering administrative support, as Garg (2021) further argues. Consequently, every emergency tool has its own unique history and background. The concept of thinking machines was first introduced by Alan Turing, who is often referred to as the father of AI (Mubeen, 2022). He presented the Turing Test, which is still a crucial yardstick for assessing machine intelligence, and asked the question “Can machines think?“ in his well-known study, “Computing Machinery and Intelligence“ in 1950 (Mubeen, 2022). Posthoff (2024) argued that the Turing Machine, Turing’s theoretical model of computation, served as the inspiration for later developments in AI and modern computing.

Grzybowski *et al.* (2024) mentioned that the Dartmouth Summer Research Project on AI, headed by John McCarthy, Marvin Minsky, and others in 1956, is credited with officially establishing AI. McCarthy *et al*. (1956) first used the term “Artificial Intelligence” and established bold objectives to build computers that exhibit sentient behaviour (Grzybowski *et al*. 2024). Sfetcu (2024) argued that in 1960, the research on AI was concentrated on symbolic systems, which emulated intelligence by manipulating symbols to represent concepts and objects. Early AI achievements raised hopes for the same year, 1960, with researchers projecting quick advancements toward the creation of machines with an intellect comparable to that of humans (Sfetcu, 2024). Throughout the 1970s, optimism quickly dissipated as AI systems struggled to find practical solutions. Vrabie (2024) stated that the challenges faced by AI programmes in terms of ambiguity, complexity, and scaling resulted in a decline in funding and interest in the subject. Vrabie (2024) noted that this is referred to as the “AI Winter,” a period of sluggish advancement and reduced funding. In contrast, expert systems, which were created to simulate human

decision-making in specific domains such as finance and medicine, experienced a resurgence of AI in the 1980s (Mostufa & Chakrabarti, 2024). The foundation for understanding the limitations of inflexible programming in complex situations was established by early AI systems such as MYCIN, which were rule-based and had limited adaptability (Mostufa & Chakrabarti, 2024). This demonstrates how machine learning techniques, which provide the adaptability and scalability required to accommodate varied and changing student learning needs, are becoming increasingly important in modern AI in education. More research is being invested in creating AI systems that work well with people, enhancing rather than replacing human abilities. Human-AI interaction, explainability, and trust in AI systems are the three primary areas of ongoing study (Lyu & Wu, 2025). To design AI systems that are reliable and efficient for human users, these fields are essential since they tackle important issues. Emma (2022) noted that the initial applications of AI were therefore rule-based systems and symbolic AI, which focused on encoding information into explicit rules and laid the groundwork for further developments. These early uses paved the way for today's more sophisticated AI solutions, which tackle explainability and user trust issues.

Advances in fields such as computer vision and natural language processing were made possible by the transition to machine learning, particularly with the introduction of neural networks (Radanliev, 2024). The literature contains contradictions, though, as Mostufa and Chakrabarti (2024) note the inadequacies of early rule-based programming AI systems, such as MYCIN, including their inability to scale and adapt, which is significant to the study and DE in various ways. The limitations of early AI systems, including their inability to adapt or scale, teach essential insights about AI applications in DE situations. In DE, where students have a variety of learning needs, preferences, and obstacles, scalable and flexible AI technologies are critical. If AI technologies in DE are unable to properly scale or personalise learning experiences, they may fail to support students in ways that match their specific needs. Understanding these constraints is crucial for the future of AI integration in education. In the context of DE, it is critical to ensure that AI

systems can provide dynamic and individualised learning experiences, like the more advanced AI technologies currently in use.

However, since the introduction of neural networks, Radanliev (2024) has emphasised the effectiveness of machine learning systems, especially in domains like computer vision and natural language processing. Adding to these paradoxes, the transition to machine learning is perceived as a breakthrough that represents a demonstrable improvement in AI research, while rule-based systems are depicted as limited and less adaptable. In this example, the paradox emphasises the shift from inflexible, rule-based systems that may fail to accommodate the different needs of DE students to more flexible, machine learning-based systems that promise to enhance student experiences by adjusting to individual learning preferences. Even while they concede varying degrees of success, both Mostufa and Chakrabarti (2024) and Radanliev (2024) agree on the fundamental significance of rule-based systems.

Mostufa and Chakrabarti (2024) and Radanliev, (2024) recognise that the foundation for more sophisticated AI technologies was laid by early AI systems, such as rule-based and symbolic AI. Mostufa and Chakrabarti (2024) highlight several drawbacks, but both authors concur that these early systems were crucial in paving the way for the development of AI and ML. The following section provides a discussion of ML.

3.2.4 Machine Learning

AI research moved from symbolic thinking to ML in the 1990s, where computers were taught patterns through data instead of explicit programming (Sejnowski, 2018). Sejnowski (2018) further stated that the progress in computer power and algorithms was the driving force behind this shift. Arguably, the 1990s shift to ML established the technological groundwork for the sophisticated AI technologies used in HE today. Without this change, institutions of higher learning would not have access to automated grading

systems, predictive analytics, student service portals, or adaptive learning systems (Japiassu, 2022). Artificial Neural Networks (AI) underwent a revolution with the resurgence of this brain-inspired computing technology (Osipyan *et al.*, 2022). These networks were able to learn from mistakes and adapt utilising the backpropagation algorithm, which increased their efficiency in tasks such as pattern recognition (Osipyan *et al.,* 2024). Michelucci (2024) argued that the emergence of deep learning in the 2010s, a branch of ML that employs several layers of neural networks to evaluate massive datasets, marked a turning point in AI. Large volumes of data (big data) and enhanced processing capability (GPUs) made this feasible. The notable accomplishment of DeepMind's AlphaGo, which defeated Go champion Lee Sedol in 2016, demonstrated AI's proficiency in complex decision-making situations (Stokel-Walker, 2024). The potential of AI in tasks like object detection and categorisation was further demonstrated by ImageNet, a large-scale image recognition competition (Kim & Sohn, 2024). Kim and Sohn (2024) further noted that practical AI applications, such as facial recognition, driverless vehicles, and virtual assistants (like Alexa and Siri), were made possible by deep learning. AI has transformed numerous businesses in distinct ways, even within fields such as education, healthcare, banking, and entertainment. Osipyan *et al.* (2022) and Michelucci (2024) both highlighted the importance of neural networks; however, Michelucci focused on deep learning, while Osipyan *et al.* concentrated on backpropagation. Both strategies utilise neural networks to enhance AI's effectiveness in complex tasks, such as pattern recognition.

Michelucci (2024) and Kim and Sohn (2024) concurred that big data, which refers to vast datasets and increased processing power such as GPUs, is essential for enabling advanced AI systems. These developments were significant to the success of both ImageNet and AlphaGo. The rising capacity of AI to do real-world tasks, such as pattern identification (Osipyan *et al.,* 2022), sophisticated game decision-making (Stokel-Walker, 2024), and image recognition (Kim & Sohn, 2024), is widely acknowledged across references. The relationship between ML and generative AI emphasises that although

generative AI is made possible by ML, generative AI explicitly uses these skills to create creative material, turning data insights into original ideas (Vartiainen & Tedre, 2023). A detailed explanation of generative AI is provided below.

3.2.5 Generative AI

Generative AI is trained on enormous volumes of text data to provide logical and contextually appropriate responses to user inputs (Hassani & Silva, 2023). Foster (2022) defined generative AI as systems that can learn from patterns and data to produce new text, image, audio, and video material. Madaan *et al.* (2024) asserted that generative AI is becoming increasingly relevant in various areas, including the artistic, medical, and educational sectors, by producing human-like results using sophisticated ML models. A subclass of AI, known as generative AI, aims to produce new material or data that closely resembles existing data. Riemer and Peter (2024) indicated that generative AI uses patterns it learns from large datasets to produce text, photos, audio, video, and other kinds of content. The capacity of generative AI to generate innovative and human-like outputs that apply to a wide range of sectors has garnered substantial interest. Machine learning models, especially those from the deep learning field, are commonly used to construct generative AI systems (Riemer & Peter, 2024). These models generate new content by utilising the data they obtain from analysing large amounts of data, which usually originate from a range of sources, including publicly accessible datasets, social media and the internet, user-generated content, corporate and academic sources, and sensor and Internet of Things (IoT) data. Generative AI's quick development portends both exciting possibilities and challenging issues on the road. Thus, generative AI technologies have the potential to significantly benefit several industries as they continue to develop, including increased productivity, automation of complex tasks, and fostering creativity in fields such as business, healthcare, and education. As the capabilities of generative AI increase, robust ethical frameworks will be necessary to guide its creation

and application, particularly in areas such as privacy and disinformation (Uddagiri & Isunuri, 2024).

AI tool development is a dynamic field; new tools are continuously created to satisfy shifting needs, while older tools are phased out or become outdated (Ahmad *et al.*, 2022). This is one area where continuous evolution is crucial, as institutions must constantly adjust to incorporate applicable and efficient AI technology into their teaching and learning processes. Brem *et al.* (2021) argued that rapid innovation may lead to significant changes in the tools that are used at this age. Aspects such as user demand, new technologies, and changes in regulations could result in tools that differ greatly from those currently in use. Adapting to this changing environment is crucial to selecting the best and most appropriate tools for a certain application.

Bengesi *et al.* (2024) contended that, given the explosive growth and impact of generative AI, it's critical to understand the various types of tools and their applications in diverse settings. By examining tools such as ChatGPT, CopyAI, Meta AI, Lumina, Elicit, and many others, the study gained a deeper understanding of their potential applications, particularly in domains like problem-solving, discourse, and content production. Examples of generative AI tools, categorised by their main purposes and capabilities, are shown in the section that follows.

OpenAI's ChatGPT, for example, is a popular generative AI tool that helps with complicated inquiries, content creation, and interactive conversations (Singh, 2023). In response to user inputs, it generates human-like responses utilising LLM (Wang, 2024). In various fields, including physics, mathematics, the humanities, and others, ChatGPT can explain complex concepts (Singh, 2023). Jalil *et al.*(2023) posited that students can ask questions regarding any concept they are unclear about, and they will get thorough, understandable responses. As an on-demand tutor, ChatGPT may assist students with challenging homework, issues, or ideas by providing individualised advice in response to their inquiries. Nguyen *et al.* (2024) argued that students can use ChatGPT to arrange

reports, write essays, and generate ideas. Terrell (2022) stated that, based on the student's input, ChatGPT helps to create outlines, thesis statements, and even whole paragraphs. Considerable progress has been made with this feature, which helps with creating outlines, thesis statements, and entire paragraphs, especially after ChatGPT 5's 'Deep Research' capacity was introduced in 2025 (Pakkala, 2025). With this improvement, the model can now independently conduct multi-step research, evaluate a variety of sources, and compile thorough reports, providing students with more comprehensive and organised academic guidance (Choi & Chang, 2025). Tools like Copy.AI, on the other hand, are mostly focused on creating content. Copy.AI's primary objective is to aid users in generating copy for writing, social networking, marketing, and other content needs, utilising AI (Hänninen, 2024). Copy.ai belongs to the generative AI category, as, like ChatGPT, it generates new textual content depending on user inputs and is specifically designed to help with copywriting and marketing activities.

The following describes some different AI tools, emphasising their unique functions and applications. By comparing platforms such as Lumina, Elicit, which provides research-oriented support, and Copy.ai, which specialises in content generation, the study reveals how these technologies perform complementary roles in both academic and professional settings. However, it is recognised that various other AI tools are currently accessible and continue to be developed at a rapid pace, thereby gradually expanding the spectrum of applications in both academic and professional contexts (Valavanidis, 2023).

The AI branch of Meta (previously Facebook), known as Facebook AI or Meta AI, focuses on a variety of AI technologies, including generative AI. Meta AI works on a variety of models, including generative tasks, text-to-image generation, and LLM. Sci space is an AI-powered research assistant with the purpose of assisting researchers in examining scholarly articles, producing summaries, and demystifying intricate information (Ifelebuegu *et al.*, 2023). Like technologies such as Elicit, it leverages generative AI to

produce research-related content and offer insights (Hernández Leo & Sánchez Reina, 2024).

Lumina is an AI application that generates material based on scientific publications and offers summarisation and contextual insights to help with research activities (Oprescu *et al.*, 2020). Eysenbach (2023) contended that Lumina utilises generative AI models to assist scholars in further developing their language and understanding complex data.

Elicit is an AI-powered research assistant designed to assist scholars in formulating queries and identifying relevant scholarly literature (Srivastava & Agarwal, 2024). Utilising generative AI, Elicit offers automated literature evaluations, insights, and summaries to assist researchers in formulating theories and gathering data (Ma & Sun, 2020). ChatGPT, Copilot, SciSpace, Lumina, and Elicit are examples of generative AI systems that use cutting-edge machine learning techniques to improve a variety of industries, including research, business, and education. Based on the input they receive, they produce research ideas, summaries, code, or text (Frank *et al.*, 2024). Though these generative tools can be useful, students must use them responsibly.

3.2.6 The Integration of AI Tools into Learning Management Systems

AI technologies of all kinds are being used in HE to improve teaching, learning, and administrative procedures. Meinel *et al.* (2024) stated that these technologies include automated systems that help with repetitive work and more sophisticated AI applications that enhance research productivity and learning results. In HE, LMS are essential for supporting blended and online learning. LMS function as digital platforms that facilitate communication between students and teachers, manage student participation, measure performance, and deliver course information (Sergeev *et al.*, 2021). Rodríguez *et al.* (2024) indicated that well-known LMS like Moodle, Blackboard, and Canvas have developed to incorporate AI features like automated feedback, adaptive learning

pathways, and predictive analytics, which improve the efficacy and personalisation of teaching and learning procedures. Meinel *et al*. (2024) further stated that an open-source LMS called Sakai has improved AI features to track student development and customise lessons depending on individual performance. The LMS platform Moodle has AI-powered plugins that monitor student involvement and provide individualised learning experiences (Meinel *et al*., 2024). Through the use of AI, Moodle can identify at-risk students based on their performance and level of activity.

Atlas (2023) stated that AI chatbots are used to help students with routine questions, such as deadlines, academic support, and course registration. As a result, this leads to a reduction in administrative work and provides students with round-the-clock support, faster response times, and real-time assistance (Atlas, 2023). Jamro and Jamro (2023) argued that numerous LMS platforms, including well-known ones like Moodle and Canvas, have integrations with tools like Grammarly, QuillBot, and Wordtune that help students improve in writing academically. Many students utilise AI-powered writing tools, such as Grammarly, Quillbot, and Wordtune, to assist them with paraphrasing in their academic writing (Raheem *et al.*, 2023). These resources, available within the LMS interface, provide real-time writing assistance through grammatical checks, ideas for paraphrasing, and style enhancements (Kim & Song, 2024). Grammarly can be integrated into LMS to provide grammar and style recommendations while students are drafting assignments, encouraging more precise and understandable academic writing. By integrating these tools into the LMS, students can more easily receive writing assistance without having to navigate between different platforms.

Moodle and Sakai are two well-known LMS that have drawn a lot of interest in studies on AI integration (Molinari, 2022). Moodle uses AI tools such as predictive analytics to monitor student involvement and identify potential difficulties early on (Crearie *et al.*, 2019). AI can successfully determine student involvement levels by monitoring behaviours like login frequency, assignment submissions, and forum activity. This data

can then be utilised to alter learning paths, resulting in a more personalised learning experience. Crearie *et al.* (2019) also mentioned utilising AI to automate administrative duties in Moodle, such as attendance and grading, to enhance efficiency and allow professors to engage with students more directly. Incorporating AI-powered plugins into Moodle and other LMSs is regarded as revolutionary for increasing student engagement. AI may be integrated into Sakai, an open-source LMS, particularly for personalised learning paths and content recommendations (Micha, 2019). The use of AI to modify Sakai's content delivery according to each student's learning style and pace is suggested by researchers such as Yazidi *et al.* (2020), enabling a more personalised learning experience. Both systems feature AI-enhanced capabilities designed to make learning more responsive and targeted, resulting in a more successful and engaging educational experience (Kakhkharova & Tuychieva, 2024). Meinel *et al.* (2024) highlight this as a significant advantage, stating that individualised education can lead to better learning results by tailoring content and tempo to the student's needs.

Generative AI and LLM are closely related but represent distinct facets of AI. The phrase generative AI refers to AI systems that use input data to produce new material, such as text, graphics, audio, or code (Bandi *et al.*, 2023). In contrast, LLMs are a particular kind of generative AI that is primarily intended to comprehend and produce text that is like that of a human. Large volumes of text data are used to train LLMs, including GPT models, which employ sophisticated algorithms to anticipate and generate language in response to cues (Johnsen, 2024). Consequently, not all generative AI models are LLMs, even though all LLMs are generative AI (Jo, 2023). Di Biagio (2022) stated that understanding the differentiation between generative AI and an LLM is crucial, as it elucidates the distinct proficiencies of LLMs in the wider domain of generative AI, facilitating a more precise discourse of each term concerning AI implementations in educational settings. Accordingly, the subsequent section covers a discussion about LLMs.

3.2.7 Large Language Models

An LLM, which is an AI system, uses deep learning methods to understand and produce human language (Raiaan *et al.*, 2024). A foundational aspect of all models is transformer architecture, which enables them to understand the contextual connections between words for processing and producing text (Raiaan *et al*., 2024). LLM can answer a variety of questions, produce original writing, support research, and even simulate human-like dialogues because they have been trained on enormous datasets, which frequently include billions of text samples from books, websites, and other written sources. Kumar (2024) mentioned that AI advances are the foundation for the creation of LLM. Kumar (2024) further stated that more complex iterations, such as GPT-3 and GPT-4, have significantly advanced the field from earlier GPT models, which have grown over time. Among the many applications of LLMs are sentiment analysis, content summarisation, text generation, language translation, and even conversational bots in the fields of healthcare, education, and customer service (Raiaan *et al*., 2024). LLM support researchers and students by creating portions of research papers or summaries of the literature and helping to explain complicated subjects (Raiaan *et al*., 2024). In high-stakes applications such as legal, educational, or medical advice, LLMs may produce content that appears credible but is factually inconsistent, which raises questions about their dependability (Raiaan *et al*., 2024). The university on which this research site is based has recently developed teaching and learning AI guidelines, reflecting the increased demand for developing ethical criteria for the use of LLMs in South African HE institutions (Murgatroyd, 2024). This is to guarantee that LLM applications are fair, transparent, and accountable, all of which are very important. In the future, it is expected that LLMs will gain even more capability, including the capacity to comprehend complicated language, engage with various types of data (such as visual or audio inputs), and manage challenging problem-solving assignments (Murgatroyd, 2024). LLM perform better when multimodal models incorporate language with pictures, videos, and other kinds of input.

To summarise, LLMs offer hitherto unheard-of capacities for language generation and understanding, marking a significant advance in AI. However, their growth presents several difficulties, namely regarding prejudice, data privacy, and ethical use (Liu *et al.*, 2023). To ensure that LLMs minimise their risks and contribute effectively to society, it will be imperative to address these problems as research and development proceed. Perkins (2023) contended that as LLMs are increasingly incorporated into students' learning environments, issues such as academic integrity, dependency, and equitable access must be addressed to ensure that these technologies reduce risks and effectively benefit society, especially in education. Carobene *et al.* (2024) posited that without rules and instructions on the safe use of AI, students can overly rely on these resources or face moral dilemmas regarding originality and authorship. Educational institutions can help students utilise AI in ways that enhance authentic learning and long-term academic improvement by implementing frameworks that encourage responsible use and foster critical thinking skills (Vincent-Lancrin & Van der Vlies, 2020).

3.2.8 The Role of AI in Higher Education and Open Distance Learning

Globally, AI is revolutionising traditional educational systems by facilitating personalised learning, expanding access to instructional materials, and streamlining administrative duties (Oluyemisi, 2023). Dogan *et al.* (2023) argued that the accessibility of big data, the capacity of AI technologies to create their own models, and the growing popularity of learning analytics techniques compel us to consider the best ways to apply AI to education in general and ODL in particular. As a result, this section discusses how AI can be used to meet a range of educational demands in HE and ODL, with an emphasis on intelligent tutoring systems, adaptive learning technologies, and predictive analytics. In South Africa and the world at large, the introduction of AI into HE is changing how institutions function, how students acquire knowledge, and how academic goals are met. Hlongwane *et al.* (2024) argued that AI technologies have gained traction in this field by providing answers to problems in education and opening new avenues for students and organisations. In

addition, Hlongwane *et al.* (2024) argued that the education field covers the significance of AI in South Africa's higher education system as well as its applications, possible benefits, difficulties, and prospects.

AI tools can assist large, diverse student populations who may struggle in traditional learning settings due to factors such as geography, socioeconomic status, and limited access to technology, according to research (Pedro *et al.*, 2019). Distance learning has advanced, yet issues including engagement, lack of personalisation, and delayed feedback still exist (Edwards-Fapohunda & Adediji, 2024). The varied demands of students are frequently not met by traditional distance learning approaches, resulting in poor completion rates and high dropout rates (Xavier & Meneses, 2021). This study aims to provide insights that can enhance student retention and satisfaction rates in ODL, particularly in South Africa, by investigating how AI can improve engagement, personalisation, and timely feedback in distance learning environments. AI integration in distance learning not only overcomes the drawbacks of conventional teaching techniques but also supports sustainable development ideals (Edwards-Fapohunda & Adediji, 2024). By promoting lifelong learning and reducing educational disparities, AI can enhance the quality and accessibility of education (UNESCO, 2019). The technological revolution of the past few decades has had several significant effects and ramifications for higher education, as it has enabled the creation of new environments and training modalities, in addition to procedures supported by contemporary knowledge management processes (Esteve & Gisbert, 2016).

3.2.9 Benefits of AI for Learning

AI technology automates tedious administrative tasks, freeing staff to focus on student engagement and academic excellence. AI can potentially improve education offerings and reduce operational expenses over time. In recent years, AI devices like MeetGeek and Read Assistant, which enable users to record meeting minutes using AI rather than manually typing them, have gained popularity. These methods considerably reduce the

administrative staff's workload, allowing them to focus on student services rather than time-consuming chores such as minute-taking. This trend is particularly pertinent to this research on student experiences on the integration of AI in HE because it illustrates the potential for AI to improve administrative efficiency and free up critical time for more student-centred activities.

With the right institutions and policies in place, AI has the potential to completely transform South African higher education in the future (Sanders & Mukhari, 2024). To create and administer AI-driven instructional tools more effectively, HE institutions should concentrate on providing staff with training in data science and AI technology (Sanders & Mukhari, 2024).

AI has the potential to change HE in South Africa by improving accessibility, personalisation, and effectiveness (Opesemowo & Adekomaya, 2024). Although there are many prospects, issues, including the digital gap, infrastructure, and ethical concerns, must be addressed for AI to be successfully incorporated into the education sector (Opesemowo & Adekomaya, 2024). This would contribute to students' future readiness and uphold justice and fairness in their access to high-quality education.

With its on-demand information access, tailored support, and quick feedback, AI has the potential to improve educational experiences (Shur-Ofry, 2023). Zhang and Zhang (2024) stated that the incorporation of AI in education has the potential to alter existing educational methods, providing students and instructors with tailored, data-driven, and accessible learning experiences. Consequently, with AI, instructors and students can learn more effectively, as it provides them with access to data and information that enhances their understanding of the subject matter. Therefore, since AI has access to the necessary information and can obtain it instantly, it may also provide ideas on a subject, particularly one that students and lecturers are unfamiliar with.

Javaid *et al.* (2023) further asserted that AI can instantly locate pertinent data, explanations, definitions, and examples on a variety of subjects, enhancing students' comprehension and broadening their knowledge base. Furthermore, with AI, users can simply type in what they want to know, and the system will provide the answers they need, whereas with a textbook, users must turn pages to find the information they need.

Javaid *et al*. (2023) indicated that students get access to a wealth of knowledge from different sources through AI. Singh and Ram (2024) mentioned that AI has the power to completely change education by enabling more individualised, flexible, and accessible instruction for students of all backgrounds and skill levels. Ossiannilsson *et al.* (2024) stated that AI facilitates real-time information sharing and collaboration on projects between educators and students worldwide, thereby reducing geographical boundaries and promoting a global learning community. In addition to making the same arguments as Saini *et al.* (2024) in the section on the brief synopsis of AI in education, Matre (2024) contended that AI technology tools such as ChatGPT, CopyAI, and Copilot offer the ability to assist students with disabilities, particularly those with impairments, in learning utilising AI, accessing information instantaneously, and making studying easier. These tools, for example, can produce simpler explanations, convert text to audio, or provide real-time feedback, making content more accessible to students with visual, hearing, or cognitive impairments. By incorporating AI into their learning processes, students can study complex subjects at their own pace, receive individualised help, and minimise hurdles that traditional learning environments could pose. Faresta (2024) mentioned that AI enables the creation of individualised learning experiences that respond to the needs of individual students, allowing them to progress at their own speed. Faresta (2024) stated that AI-powered systems can analyse student performance and provide focused feedback and personalised study programmes. In most parts of Africa, the COVID-19 pandemic has accelerated the adoption of AI-powered online learning platforms, enabling institutions to deliver education remotely. Srinivasa *et al.* (2022) highlighted that AI improves lecture delivery, automates exams, and facilitates online interactions between

students and educators. Students in underserved and rural areas, where educational resources are scarce, can benefit from AI by accessing learning tools (Olusegun, 2024). Students can access top-notch education from anywhere, thanks to online platforms and AI-powered learning tools. Despite the advantages that AI offers, in South Africa, there is a notable inequality in access to digital tools and the internet, especially between urban and rural areas, particularly for students in economically disadvantaged and rural areas. Annuš (2024) mentioned that AI enhances students' comprehension and retention of material by providing tailored learning experiences.

Despite the advantages of AI for education, some limitations are discussed in more detail in the section below.

3.2.10 Limitations of AI for Learning

AI presents ethical conundrums pertaining to transparency, autonomy, and accountability in decision-making. Mulenga and Shilongo (2024) posited that these ethical dilemmas arising from students utilising AI can be linked to the issue of plagiarism, which occurs when students submit their own work as original while neglecting to cite their sources. AI has the potential to impair students' critical thinking if it is not used to enhance learning or progress technical tools. This is because students may become overly dependent on AI, failing to validate their own learning or apply newly acquired knowledge, utilising tools like ChatGPT (Kolade *et al.*, 2024). Unequal access to AI-powered learning resources and tools could exacerbate already-existing educational inequities. Students from less fortunate backgrounds may not have access to computers, fast internet, tablets, or other devices required to properly utilise AI-powered teaching resources (Jin & Deng, 2024). The gap between affluent and impoverished students may widen due to this technology imbalance.

Mitelut *et al.* (2023) mentioned that AI has some restrictions that users should be aware of. It's possible for AI to occasionally provide responses that sound plausible but are factually unsound or lack context understanding (Mitelut *et al.*, 2023). Furthermore, AI may struggle to comprehend complex or nuanced questions, leading to insufficient or inadequate responses (Mitelut *et al.*, 2023). Ganesh and Sahlqvist (2024) stated that this drawback results from the fact that LLMs may not have the depth necessary to completely interpret contextually complex or nuanced queries since they rely on patterns discovered from enormous volumes of data. Consequently, users of AI who pose intricate or multi-layered queries may receive responses that omit important details or offer a cursory understanding. This emphasises the necessity for users to formulate questions in a clear manner and for continued AI research to concentrate on enhancing contextual understanding to better facilitate complex queries (Keyvan & Huang, 2022). Learning content that is either too easy or too challenging can frustrate students, but adaptive learning systems ensure they are given the proper amount of challenge to keep them engaged (Annuš, 2024).

3.2.11 Privacy, Equity, and Academic Integrity as Ethical Factors in AI Use in Higher Education

While the growing application of AI in HE offers chances for individualised instruction and administrative effectiveness, it also raises moral questions about academic integrity, equity, and privacy. Bulut *et al.* (2024) mentioned that AI relies on enormous volumes of student data to maximise learning experiences, which raises serious privacy concerns. Bulut *et al.* (2024) further asserted that AI systems have the potential to violate students' right to privacy when they examine academic performance, conduct, and even personal information to tailor learning. Although data-driven insights can improve learning, researchers caution that inadequate safeguards may lead to the exploitation of private data (Williamson & Eynon, 2020). To preserve confidence and protect student privacy, institutions must set explicit policies on data collection, use, and storage (Hakimi *et al.*,

2021). Madaio *et al.* (2022) stated that another major problem is equity, as AI systems frequently reflect biases in their training data, potentially leading to unjust treatment of students from varied backgrounds. Consequently, this bias arises when algorithms are created using historical data that may not accurately represent all demographic groups or that may reflect systemic societal injustices. These algorithms may therefore disadvantage some student groups while favouring others, escalating already-existing educational disparities (Khan & Aazka, 2023). Adamson and Darrow (2017) believe that biased algorithms may disfavour specific demographic groups, thereby exacerbating existing educational inequities (Simons, 2023). For example, predictive analytics in admissions or assessments may unjustly favour students who match the dataset's majority, continuing exclusionary practices. Researchers such as Williamson and Eynono(2020), Luckin (2016), and Eubanks (2018) advocate for greater transparency in AI design and testing methods to ensure that these systems promote fairness and inclusivity (Williamson *et al.*, 2023). The use of AI also jeopardises academic credibility. Despite the efficiency of AI, automated grading and evaluation may overlook subtleties in student work, raising concerns about fairness and the need for human oversight (Swiecki *et al.*, 2022). Furthermore, with sophisticated tools that make cheating more complex and difficult to detect, AI may unintentionally encourage academic misconduct (Rane *et al.*, 2024). To combat this, educational institutions and instructors are encouraged to implement ethical AI policies that uphold academic integrity and recognise the value of genuine student contributions (Fudge *et al.*, 2022).

AI in HE has the potential to be beneficial, but ethical issues must be taken into account to protect privacy, maintain academic integrity, and guarantee equity. AI will require cooperation from legislators, educators, and technologists to address these issues and establish moral guidelines and regulations that prioritise the needs of students and educational equity. AI in HE has the potential to be beneficial, but ethical issues must be considered to protect privacy, maintain academic integrity, and guarantee equity. It will require cooperation from legislators, educators, and technologists to address these

issues and establish moral guidelines and regulations that prioritise the needs of students and educational equity. Madaio *et al*. (2022) emphasise fairness, pointing out the dangers of biased AI systems that could result in unfair treatment. Meanwhile, Williamson and Eynon (2020) and Hakimi et al. (2021) underscore the necessity of stringent data policies to preserve student privacy. The scholars above highlight the dangers associated with implementing AI without proper protection. The scholars emphasise, though, that while AI has enormous potential, its adoption should be supported with legislation, ethical principles, or precautions to prevent unexpected harm or negative consequences. This common worry emphasises the significance of regulatory supervision and cautious implementation to prevent damage. The potential advantages of data-driven insights and the associated privacy issues are incompatible. Williamson and Eynon (2020) caution that although data can be used to increase learning personalisation, it can also be misused if appropriate controls are not in place. This creates a conflict between utilising data to improve learning and safeguarding students' privacy. While Hakimi *et al.* (2021) advocate for quick data use regulations, institutional capability and technical preparedness are necessary for their effective implementation. This urgency may conflict with the real-world difficulties of developing and implementing comprehensive policies, particularly if institutions are ill-equipped to manage sophisticated AI systems.

The literature on previous research on students' use of AI in HE and DE will be covered in the section below.

3.2.12 An International and Local Analysis of Students' Use of AI in Higher and Distance Learning

Educational institutions worldwide are increasingly utilising AI tools to enhance the learning process. These tools are intended to increase learning outcomes, promote student involvement, and streamline administrative procedures (Tiwari *et al.*, 2025). Rizvi (2023) highlighted that AI-powered adaptive learning systems, for example, can modify

the course material according to each student's performance, guaranteeing that the learning process is customised to meet their needs. Aderibigbe *et al.* (2023) reported that, as developed nations, especially the US, UK, and European countries, have incorporated AI into both DE and HE, the adoption of AI in education is accelerating globally. Though progress is being made to close the digital gap, integration has been slower in poorer nations where technical know-how and infrastructure are occasionally weak (Helsper, 2021).

AI is being employed in a range of educational contexts in various Western nations. AI solutions are most frequently used in virtual learning environments, where they facilitate online learning by providing real-time feedback mechanisms, evaluation tools, and individualised material delivery (Yadav, 2025). The study by Luckin et al. (2016), as cited by Raza and Alam (2025), described how AI-driven adaptive learning systems enable students to progress through course materials at their own pace, with content being modified based on their achievement level. AI has been found to have a major impact on students' performance. Given this, Höl (2023) highlighted that learning analytics driven by AI could provide useful insights into student behaviour, predict performance trends, and let teachers intervene before a student lags.

According to Khan (2024), students' opinions of AI tools for academic writing and research were investigated and the accuracy of AI-generated information and the moral ramifications of utilising AI in academic assignments were concerns raised by numerous students. But for others, AI tools like citation generators and grammar checkers were helpful in raising the calibre of their work (Khalifa & Albadawy, 2024).

In a distance learning environment, where students frequently study individually and remotely, AI enables personalised learning at scale. Pareek (2025) stated that even in the absence of in-person engagement, AI-driven platforms can guarantee that students receive the help they require and offer fast, personalised feedback. AI is frequently utilised

in distant learning platforms for tailored course suggestions, predictive analytics, and automated content distribution.

The use of AI in HE is still relatively new in Africa. Nonetheless, Mhlanga *et al.* (2020) discuss programmes where South African and other African scholars have begun utilising AI to enhance learning outcomes. In the context of distance learning in Africa, where access to teachers and resources may be restricted, AI can be very helpful. For example, student performance evaluation, individualised learning, and automated grading are all being done with AI techniques (Igbokwe, 2023). Hlongwane *et al.* (2024) reported that AI in HE has the potential to revolutionise African educational systems and spur innovation and industrialisation. Universities are progressively implementing AI-powered digital learning to solve issues such as a lack of instructional resources, low student engagement, drawn-out evaluation procedures, and the need for individualised learning, according to a Tanzanian study by Baynit *et al.* (2025). According to a study by Xulu *et al.* (2024) at a South African university, AI offers several advantages, including improved access to information, enhanced writing abilities, and increased participation in educational activities. In addition, Xulu *et al.* (2024) suggested that while addressing such shortcomings, institutions should focus on cultivating a culture of support that promotes responsible use. Hlongwane *et al.* (2024) believed that AI will transform HE in Zimbabwe, but its success is dependent on institutional preparation and resource availability. In contrast, Xulu *et al.* (2024), in a South African study focused on the student experience, identified a balance between enthusiasm for AI technologies and concerns about their ethical and institutional implications. Meanwhile, Baynit *et al.* (2025) showed how AI is being gradually integrated in Tanzanian universities as a practical teaching and learning tool. All information considered, AI is widely accepted throughout Africa, but its use varies depending on the situation, including available resources, preparedness, and ethical considerations. Wang *et al.* (2024) cited Osborne and Grant-Smith (2021), who investigated the rising acceptance of MOOCs (Massive Open Online Courses) in Africa and credited AI-enhanced platforms that offer high-quality education on a large scale.

Moreover, universities in South Africa are at the forefront of the continent's adoption of AI (Opesemowo & Adekomaya, 2024). Nxumalo *et al.* (2024) emphasised Pillay's (2019) coverage of the efforts made by different South African universities to incorporate AI into their academic programmes, research, and student support services. The efficacy of AI in meeting their unique learning demands and data privacy were concerns raised by some students, while others valued the individualised learning support that AI offered (Rehan, 2023). Chakabwata (2025) reported that although South Africa's AI tools are still in the experimental stage, there is evidence that they can enhance learning results and student engagement.

The amount of research on AI in education is growing; however, significant gaps remain in the field. Holmes, Bialik, and Fadel (2019) contend that, while AI is expanding in education, most studies are exploratory, with no longitudinal evidence or theory-driven practice. To evaluate the long-term effects of AI on student learning outcomes, for instance, additional longitudinal research is required. Furthermore, little is known about the ethical ramifications of AI in education, especially in South African and African contexts. Zawacki-Richter *et al.* (2019) reported that there is an area where ethical considerations, including privacy, surveillance, bias, and fairness in AI for HE, are not being sufficiently explored.

3.2.13 The Role of Policy and Guidelines in AI and Technology Use

Policies and guidelines influence how AI and technology are used, especially in HE. They define the ethical, legal, and practical parameters within which institutions can innovate responsibly, ensuring that advances benefit all stakeholders equally. This discussion is critical because policies directly influence behaviours, providing a foundation for consistent, secure, and ethical implementation. Schwartz *et al.* (2022) posited that the absence of defined policies may lead to the misuse, bias, or unfairness of AI, thereby

limiting its transformative power. Concerns about the dangers of AI use and its potential effects on human activity are growing as it spreads its influence across many facets of society (AI Regulation, 2023; World Economic Forum [WEF], 2023). Several policies were chosen because they were pertinent to the examination of students' experiences with the integration of AI in public health studies in HE. The policies that were examined are relevant to the study's research issue and, therefore, crucial since they support the practice of AI use in HE institutions. A comprehensive AI policy education framework for international university teaching and learning, as well as the South African National AI policy, are the policies discussed. The literature and policies covered in this chapter are included because they complement the results and participant quotes from Chapter 5.

A Comprehensive AI Policy Education Framework for University Teaching and Learning

A comprehensive AI policy education framework for university teaching and learning, developed by one of Asia's leading universities, which is uniquely positioned to play a leading role in the development of a comprehensive AI policy education framework (Chan, 2023). Given Asia's rapid advancements in AI and its pivotal role in the global economic, technological, and regulatory landscapes, there is an urgent need for universities to equip students with the knowledge, skills, and ethical grounding necessary to navigate the complexities of AI policy (Aithal & Maiya, 2023). Similarly, South Africa, where this study was conducted, is also experiencing rapid advancements in AI and faces a growing importance in global economic, technological, and regulatory matters. Therefore, this document outlines a structured framework for integrating AI policy education into teaching and learning environments, ensuring that students are not only equipped with the technical expertise required for AI-related fields but also possess a deeper understanding of the broader societal implications of AI.

Every industry is changing due to AI, including HE (Lee & Yoon, 2021). The social, ethical, and legal issues surrounding AI technologies are evolving rapidly. As knowledge-based

organisations, universities play a significant role in educating the next generation of citizens, engineers, leaders, and legislators about the implications of AI. The goal of this framework is to provide a comprehensive approach for integrating AI policy education into university instruction. Governments worldwide are concerned about several key issues, including AI bias and discrimination, data privacy breaches, human rights violations, and the malicious use of AI (Greiman & Hogenhout, 2021). Federspiel *et al.* (2023) warn that abuse of AI could lead to existential hazards to humanity by promoting human manipulation, dividing society, and exacerbating inequality. In light of this, nations have begun developing national policies and strategies to provide more precise guidelines on the use of AI, optimising its benefits and minimising its risks. Ethics, which deals with "the standards of right and wrong, acceptable and not acceptable", has been the main emphasis of most national AI policies in an effort to promote the ethical and appropriate management of AI technology (Hogenhout, 2021:11).

Explainability, openness, and equity in AI-driven decision-making and the creation of human-centric AI solutions are recognised as important tenets for the ethical application of AI in Singapore's official AI governance framework (IMDA & PDPC, 2020). In addition to individual countries, regional and international organisations have prioritised ethics in their AI policy. In 2021, for instance, UNESCO adopted the Recommendation on the Ethics of AI, which was supported by all 193 Member States. As fundamental values, this international standard emphasises human rights, dignity, justice, accountability, transparency, and non-discrimination (Morandín-Ahuerma, 2023). In a similar vein, numerous nations have accepted the OECD AI Principles, which were created by the Organisation for Economic Co-operation and Development (OECD) in 2019. Throughout the AI lifecycle, these principles support accountability, transparency, robustness, human rights, and inclusive growth (Hosseini Tabaghdehi & Ayaz, 2025). The Framework Convention on AI, Human Rights, Democracy and the Rule of Law (2024), one of the first legally binding international treaties on AI, was adopted by the Council of Europe, taking things a step further. In contrast to voluntary guidelines, this convention requires that

members ensure AI systems are in conformity with democratic values, human rights, and the rule of law throughout their entire lifecycle (Rotenberg, 2025). Consequently, this highlights the gravity of ethical issues in AI governance by establishing duties for risk management, transparency, and documentation.

Human rights and values outlined in the Universal Declaration of Human Rights (UDHR) are therefore recommended to be adopted as the necessary foundation to further promote beneficial and appropriate use of AI technologies, as UNESCO developed its guidelines on the ethical use of AI technologies by emphasising the fundamental idea of human-centeredness (UNESCO, 2021, 2023). Additionally, Singapore's official AI governance framework acknowledged the explainable, transparent, and fair. As noted in Renda's (2020) report, the European Union's (EU) AI policy included a human-centric approach to AI and prioritised ethics. The EU proposed its own pillars (legal compliance, ethical alignment, and sociotechnical robustness) to ensure the trustworthiness of AI and established a specific AI expert group to work on specific policy recommendations and guidelines to safeguard EU citizens from the danger of abusing advanced technologies. The national and regional governments' heavy focus on ethics highlights their limited ability to actively encourage the use of AI in higher education, with institutions and individual users bearing the majority of the responsibility for adoption and implementation. Having stated that, governments may not have the necessary infrastructure and technical expertise to directly develop AI, allowing private businesses and academic institutions to undertake most of the innovation (Bokhari & Myeong, 2022). The difficulty of establishing a global definition of ethical norms makes developing AI legislation challenging for some countries, as values, cultural contexts, and regulatory priorities vary across regions (Dexe & Franke, 2020). While the European Union has introduced the AI Act, which places a strong emphasis on data privacy and human rights, other regions, such as parts of Africa, are still developing frameworks, often balancing ethical concerns with the pressing need to expand digital access and innovation (Bor & Koech, 2023). This lack of agreement challenges the development of consistent regulations to govern AI use, especially its

incorporation into higher education. However, because AI can become ingrained in human activities, it is difficult for governments to create specific policies on its use because of the broad coverage of policy areas that result, from governance to education and even the environment (UNESCO, 2021).

However, as the Singaporean AI governance framework made clear, model frameworks and ethical principles were intended to serve as a guide and should be used as such (IMDA & PDPC, 2020). AI practitioners should consider this with flexibility and in accordance with the specific circumstances at hand. The development of ethical and legal guidelines and discussions will remain a top priority in the future as national and international organisations continue their efforts to guarantee the beneficial application of AI technologies (UNESCO, 2023; AI Regulation, 2023).

The formulation of ethical and legal rules for AI will remain predictive and prescriptive in character until they are verified and validated through the actual use of AI technology in real-world educational contexts (Fedele *et al.*, 2024). To effectively govern AI practices in compliance with established legal and ethical standards, nations may eventually need to establish institutional support structures (Renda, 2020).

After examining international AI policy at one of Asia's top universities, the discussion below focuses on South Africa's national AI policy. The inclusion of both international and local policies in this literature review enhanced the analysis's depth and scope by allowing the researcher to identify patterns, obstacles, and opportunities (Bibri & Krogstie, 2017). This, in turn, increased the research's applicability and relevance. As a result, the comprehensive AI policy education framework for university teaching and learning serves as a foundation for the ethical, effective, and long-term adoption of AI technologies in higher education and open learning.

South Africa National AI Policy

The South African (SA) National AI Policy serves as the foundation for developing AI legislation and, potentially, an AI Act in South Africa (Department of Communications & Digital Technologies [DCDT], 2021). The policy document emphasises that as regulators strive to establish AI rules and standards, it is crucial that these regulations are grounded in a clear policy direction that reflects the country's vision and aspirations for AI. The National AI Policy, by establishing a clear policy framework, drives the creation of strong regulatory mechanisms to ensure AI applications are safe, ethical, and in the public interest. This will not only safeguard citizens from potential harm but will also increase trust in AI technology, boosting adoption and fostering a healthy AI ecosystem in South Africa.

Adopting AI can help South Africa's economic development, provide job opportunities, and promote economic resilience, especially when it is integrated into the education sector. According to Yadav and Shrawankar (2025), AI in education can enhance learning outcomes, extend access to quality education, and provide students with the skills required to flourish in an AI-driven economy. By implementing AI technologies in classrooms and curricula, South Africa can better prepare its workforce for the future, ensuring that students acquire both the technical expertise and critical thinking skills necessary for new industries. The widespread use of AI tools in education can help close educational gaps by making learning more personalised and accessible to students from diverse locations, thereby supporting the country's long-term economic and social development (DCDT, 2024).

Similar to the comprehensive AI policy education framework for university teaching and learning, South Africa's national policy emphasises that AI technologies are advancing rapidly worldwide, making it essential for the country to adopt these innovations to remain competitive and relevant (Chan, 2023). To avoid falling behind in technological capabilities, South Africa must keep pace with global advancements. Moreover, AI holds significant potential for driving economic growth by enhancing productivity, creating new

industries, and fostering innovation. Embracing AI can stimulate South Africa's economic development, generate job opportunities, and strengthen economic resilience (DCDT, 2021). Adopting AI can boost South Africa's economic development, create job opportunities, and increase economic resilience, particularly when it is integrated into the education sector.

A key goal of AI is to improve access to services and address inequities, promoting the social equity goal (DCDT, 2024). AI can help overcome gaps in healthcare, education, and economic prospects, promoting inclusion and reducing disparities. Ensuring that AI contributes to social equity by addressing disparities and improving access to services is a key goal (DCDT, 2024). AI can help bridge gaps in critical sectors, such as healthcare, education, and economic opportunities, promoting inclusivity and reducing inequalities. For instance, AI-powered educational technologies can provide individualised learning experiences, increasing access to high-quality education for students in underserved or rural places. The study's objectives, which focus on integrating AI into education and highlighting its potential to alleviate societal inequities, align well with the capabilities of AI. By leveraging AI technologies strategically, South Africa can not only improve the quality of services but also ensure that these advancements benefit all members of society, reducing the digital divide and promoting social equity.

DCDT (2024) argued that the National AI Policy Framework for South Africa serves as a strategic blueprint designed to leverage AI technologies for driving the country's economic growth, technological advancement, and societal well-being. With a strong emphasis on ethical development, the framework prioritises the responsible deployment of AI in a manner that aligns with South Africa's core values and national priorities. By establishing ethical guidelines, the framework aims to ensure that AI systems are developed and implemented with a focus on fairness, accountability, transparency, and inclusivity (DCDT, 2024). This approach not only fosters trust among citizens and stakeholders but also mitigates potential risks such as bias and discrimination in AI applications. In addition

to ethical considerations, the framework outlines key pillars such as robust data governance frameworks, infrastructure enhancements, and significant investments in research and innovation. These pillars are crucial for creating an environment that enables AI technologies to thrive and contribute meaningfully to sectors such as healthcare, education, and public administration.

The proposed ethical AI governance structure not only helps mitigate potential risks such as prejudice and discrimination in AI applications but also fosters trust among stakeholders and citizens. Along with ethical issues, the framework identifies other important pillars, including robust data governance, enhanced infrastructure, and substantial investments in research and innovation (Levy, 2025). These pillars are crucial for creating an environment that enables AI technologies to flourish and make significant contributions to sectors such as healthcare, education, and public administration. Addressing ethical challenges such as bias and discrimination is critical when incorporating AI tools in South African and international higher education institutions (Slimi & Carballido, 2023). Jiang *et al.* (2023) reported that students and staff entrust institutions with sensitive information such as academic records, personal identifiers, and even behavioural data. Breaches of this trust, such as data breaches or misuse, can have major consequences, including identity theft, reputational harm, and a loss of faith in educational institutions (DCDT, 2024). Ethical data governance protects privacy and promotes a secure learning environment.

3.2.14 Chapter Summary

This chapter presented a detailed literature review for the study, which focused on AI and its impact on higher education. The chapter discussed previous studies, both national and international, with a focus on the role of technology in remote education. It also discussed ethical issues surrounding AI use in higher education, such as privacy, equity, and academic integrity, as well as the limitations and benefits of AI for learning. The chapter

further discussed the role of policies and guidelines in AI and technology use, including a comprehensive AI policy education framework for university teaching and learning, as well as South Africa's national AI policy.

The following chapter will focus on the research design and methods.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

The previous chapter detailed the literature review for this investigation. This chapter focuses on the research paradigm that underpins the study as well as the research design and methods used to meet its aims. Many researchers have provided definitions for the term "research methodology," emphasising its importance in directing systematic investigations. Abiodun *et al.* (2021) define the term as the methodical framework or strategy that is employed when conducting research. Research methodology refers to the guidelines that govern the design of a study as well as the collection, analysis, and interpretation of data to effectively answer the research questions (Saharan *et al.*, 2020). This chapter further clarifies the reasoning behind the selection of particular techniques and how they align with the goals and paradigm, going beyond merely outlining the techniques employed. FitzPatrick (2019) reported that this ensures the research is genuine, dependable, and rigorous, enabling the production of significant and credible results.

4.2 THE RATIONALE FOR EMPIRICAL RESEARCH

The increased use of e-learning due to the emergence of COVID-19 accelerated the rationale for the integration of AI to support learning in HE in an Open Distance e-Learning (ODeL) context, enhancing the standard of education globally. This study was not only about the literature but also about hearing the voices of relevant participants on the use of AI tools in education within a specific context, to develop a key element of an AI framework for teaching and learning integration in South African HE. Driven by the need to align educational systems with market demands, the integration of AI in higher education has profoundly transformed the administrative, teaching, and learning processes (Katsamakas *et al.*, 2024). Aithal and Maiya (2023) argued that this change

has several facets, such as dynamic teaching approaches, individualised learning, and administrative innovations. Kerdvibulvech and Dong (2021) posited that AI and extended reality tools have been collaborating more closely since the COVID-19 outbreak, particularly in online education. Thus, grounded in theory, this research study aimed to provide a thorough understanding of how a specific group of students experiences the integration of artificial intelligence into public health studies in South African higher education. In particular, the research addressed the following main and sub-research questions:

1. How do students experience the integration of artificial intelligence into public health studies in South African higher education?

Secondary Questions

I. What are the perceived benefits and limitations of incorporating AI into higher education?
II. What are the ethical considerations of utilising AI in education?
III. How does a student's lack of access to necessary technology affect the use of AI in education?
IV. What are the key elements of an AI framework for teaching and learning integration in South African higher education?

The secondary research questions were formulated in accordance with the fundamental research paradigm, guaranteeing consistency between the fields of investigation and the study's philosophical stance. This alignment facilitated the preservation of coherence between the research's underlying assumptions and the formulation and investigation of the questions.

The study paradigm is described in more detail in the next section.

4.3 RESEARCH PARADIGM

Kivunja and Kuyini (2017) described research paradigms as frameworks that drive the inquiry process in diverse domains, influencing how researchers interpret and approach their investigations. Kivunja and Kuyini (2017) argued that a research paradigm is a collection of attitudes and values that influence technique selection and the interpretation of findings.

All paradigms are underpinned by certain ontological, epistemological, and methodological assumptions (Guba & Lincoln, 1994). Ugwu *et al.* (2021) noted that the connection between ontological, epistemological, and methodological assumptions is crucial for understanding research paradigms. Saliya (2023) posited that each paradigm is distinguished by its own set of ideas about reality (ontology), knowledge (epistemology), and procedures for investigating these beliefs (methodology). This interaction influences how researchers conduct their investigations and interpret their findings (Otoo, 2020). Ontological assumptions pertain to the nature of reality and what exists (Ladyman, 2007). However, different paradigms have varying perspectives: The positivist paradigm assumes a single, objective world that can be measured. The interpretive paradigm views reality as subjective and as being produced through social interactions (Golzari, 2024). The critical paradigm concentrates on power relations and social change, emphasising the importance of transformative knowledge (Reid *et al.*, 2017). The choice of research approach should be in line with the researcher's paradigm according to Kivunja and Kuyini (2017). Kivunja and Kuyini (2017) further highlighted that action-oriented or mixed methods approaches are frequently used in critical and pragmatic paradigms, while positivist and interpretivist paradigms are best suited for quantitative and qualitative approaches, respectively.

Therefore, as argued in Chapter 1, Section 1.7.1.1, there are four main paradigms in research: positivist, interpretive, critical, and pragmatist. The following is a discussion of these four study paradigms.

The premise of positivism is that reality is quantifiable and objective. Within this paradigm, researchers strive for repeatable and generalisable outcomes, frequently utilising structured tools like experiments or surveys to gather numerical data (Ali, 2024). To minimise bias, the emphasis is on testing hypotheses, proving cause-and-effect correlations, and keeping a distance from the research subjects (Dharavath, 2025). In contrast, interpretivism, also known as constructivism, places a strong emphasis on understanding people's subjective meanings and experiences within their social and cultural contexts (Acharya, 2025). As the chosen paradigm for this study, interpretivism is explained in depth in Section 4.3.1 below.

Fuchs (2021) reported that the goal of critical theory is to expose power dynamics, social injustices, and disparities. Critical paradigm researchers seek to both study social phenomena and promote change, frequently interacting with underrepresented groups and employing action-oriented or participatory approaches (Liu *et al.*, 2025). In contrast to these paradigms, the pragmatic paradigm places greater emphasis on real-world outcomes than on rigorous adherence to any one philosophical position (Robson, 2024). Gilad (2021) argued that the pragmatic paradigm focuses on finding solutions to real-world issues and selects techniques that best address the research questions, often combining qualitative and quantitative methods. Flexibility is valued in pragmatic research, which prioritises the use and applicability of findings over their philosophical purity (Hampson & McKinley, 2023). Ugwu *et al.* (2021) argued that when combined, these paradigms provide unique insights into knowledge that help researchers frame their work in accordance with the nature of the research challenge, choose techniques, and interpret findings.

In addition, these four philosophical perspectives are the common paradigms in contemporary organisational research. As indicated in Chapter 1, Section 1.6.1, this study employed an interpretivist paradigm to gain an in-depth understanding of the world in which the participants live, as well as to reveal their perceptions and experiences; this will be discussed next.

4.3.1 Interpretive Paradigm

The interpretive paradigm is a research approach that focuses on understanding human experiences, behaviours, and interactions from the participants' perspectives (Pervin & Mokhtar, 2022). Muzari *et al.* (2022) highlighted that in qualitative research, the interpretive paradigm is frequently employed to investigate meanings, interpretations, and social realities. Each student’s experience with integrating AI into their learning is unique and influenced by a variety of factors, including their background, level of technological proficiency, and access to resources for learning. This study aimed to understand the experiences of students in this regard. Utilising the interpretivist paradigm, this study also offers deep, contextualised insights into how students understand and interpret the use of AI in public health teaching. This paradigm draws attention to the human component of AI in education while providing viewpoints that can educate institutions, educators, and legislators on the advantages and difficulties of AI in HE.

Interpretivism acknowledges that knowledge is developed collaboratively via social interaction, influenced by meaning and context, and based on the knowledge that reality is subjective and socially constructed, as argued by Pervin and Mokhtar (2022). These traits impact the ontology, epistemology, and methodology of its philosophical underpinnings. Covering the aspects of interpretivism, namely ontology, epistemology, and methodology, is significant because it reveals the philosophical assumptions underlying the study and gives a transparent reason for the selected research techniques.

The table below summarises how the study has adopted Interpretivism.

Table 4.1: Key Aspects and Adaptations of Interpretivism (Researcher's own)

Aspects of Interpretivism	Application to This Study
Ontology Ontology is the term used in research to describe the presumptions about the nature of reality that influence how knowledge is seen and examined (Ylönen & Aven, 2023).	• This study looked for these various realities and significant activities through the chosen school to determine participants' knowledge, opinions, interpretations, and experiences, since reality can be examined and formed through human interactions. • The emphasis is on genuine and relevant students' lived experiences to comprehend AI integration. • By investigating participants' interpretations, this study discovered how they perceive, experience, and respond to AI technologies in their studies.
Epistemology Epistemology in research refers to the fundamental assumptions about the process of acquiring and verifying knowledge (Sol & Heng, 2022).	• In this study, knowledge is influenced by specific social, cultural, and institutional settings. • Students' exposure to technology, the classroom setting, and institutional support all influenced how well they understood AI tools. • By observing real-world situations or natural environments, the researcher was socially creating knowledge and gathering data that advanced the research endeavour. • This study also focused on subjective, experiential knowledge produced from students' life experiences.

Methodology Methodology refers to the systematic approach, principles, and procedures used in research to collect, analyse, and interpret data (Saxena, 2024).	• The study used a qualitative research design, concentrating on exploratory and descriptive methodologies, as described by Saxena (2024). • Interviews, document analysis, and open-ended questionnaires were the methods used in the data collection technique. • The researcher collected extensive, contextualised insights while being open to emergent themes.

This interpretivist paradigm provided extensive and meaningful insights into how students experience the integration of AI in public health studies, while respecting their individual circumstances and viewpoints. As a result, the following section will focus on the research design, which is informed by the research paradigm.

4.4 THE RESEARCH DESIGN

In essence, a research design is a blueprint that describes how to gather and analyse the data required for a study. The research design serves as a methodical framework that directs the research process and guarantees that every stage is connected and logical (Daniel *et al.*, 2024). The research problem and the study's overall context should be taken into consideration while selecting a research design. A research design's main goal is to convert a research problem into data that can be analysed so that the researcher may successfully and economically address the research questions (Hunziker & Blankenagel, 2021). Before beginning data collecting and analysis, a researcher must follow a methodical set of procedures to make sure the study achieves its goals in a valid and trustworthy way. Additionally, the research design dictates the kinds of analysis required to produce the desired outcomes (Ghanad, 2023). Ghanad (2023) further argued that research design outlines the types of data required, the methods for collecting and

evaluating that data, and how the results will answer the research questions. The successful completion of any research project depends on the use of an acceptable study design.

An exploratory strategy, which is especially appropriate when the research topic is novel or when data gathering provides significant problems, will be used in this study. AI integration in HE is a relatively young and developing field of study because of the significant changes in education delivery and accessibility, particularly in the post-COVID-19 period. Students had mostly relied on textbooks and other conventional learning platforms before the introduction of ChatGPT in November 2022, with little emphasis on AI-driven learning aids. The development of digital technology and ubiquitous internet access, which have broadened the breadth and possibilities of teaching and learning, have contributed to the rise of AI. As a result, there are many study opportunities to explore the implications, efficacy, difficulties, and best practices of integrating AI as a significant educational paradigm. A crucial path for academic contribution in the context of higher education is to investigate creative instructional design, AI integration tactics, learner engagement, and the overall effect of AI on educational outcomes. Exploratory research is a methodological approach that investigates issues that haven't been thoroughly studied before (Fu *et al.*, 2023). This study will go into more detail on the research approach, and research type in the part that follows, placing them within the general framework of the research design.

The next section outlines the research approach that guided this study.

4.4.1 Research Approach

This study employed a qualitative research approach consistent with the interpretivist paradigm. It stressed understanding participants' subjective experiences in their social and educational environments. While research procedures often include qualitative,

quantitative, and mixed methods, the qualitative approach was used for this study because it provides for a thorough examination of participants' viewpoints, behaviours, and experiences.

Tracy (2024) posited that in qualitative research, the approach is centred on understanding and analysing participant experiences, meanings, and viewpoints. Mohajan (2018) noted that qualitative research aims to provide a detailed, in-depth account of social phenomena, in contrast to quantitative research, which places greater emphasis on statistics and related data. Mohajan (2018) further argued that for a thorough investigation of human behaviour, experiences, and social processes, the qualitative research approach is ideal. The research approach provides a sophisticated understanding of the underlying "why" and "how" of occurrences, offering insightful information about complex problems that quantitative approaches may overlook (May & Perry, 2022). The research approach in this qualitative study was crucial to the analysis of the data. Researchers' interpretation and understanding of the data, which is typically non-numerical (such as field notes, observations, or interview transcripts), is influenced by their research methodology. The purpose of this qualitative study was to investigate and uncover unidentified problems. When engaging with participants in public health studies, the researcher employed data-gathering techniques to understand their experiences with integrating AI. The researcher aimed to establish a personal rapport and understanding with the research participants after the study was confirmed as qualitative, naturalistic, and interpretive. This implied that, rather than utilising controlled or experimental settings, the research aimed to explore participants' experiences within their natural environment. The study of the "lived world" as experienced by individuals is the primary focus of naturalistic inquiry, which has its roots in phenomenology and hermeneutics (Køster & Fernandez, 2023). Naturalistic studies avoid fabricated experimental environments in favour of real-world social contexts where meaning-making occurs (Low *et al.*, 2025). The method of naturalistic studies places the researcher as a co-constructor of knowledge rather than an impartial observer, emphasising reflexivity

and intersubjectivity. As highlighted in section 4.4, interpretivism allows for the views and experiences of the participants in this study while also understanding the reality in which they live (Nangia, 2023).

Weis and Willems (2017) stated that data analysis in qualitative research, especially within an interpretivist paradigm, entails methods and approaches meant to understand and interpret the social realities and lived experiences of participants. Instead of concentrating on numerical validation, the analysis aims to uncover meaning patterns, investigate participant viewpoints, and provide results that show how people create and perceive their reality. Unlike other approaches, the qualitative approach includes observations from researchers regarding their role, self-reflection, and the qualitative strategy employed (Hennink *et al.*, 2020).

4.4.2 Research Type

A case study within qualitative research entails a thorough, contextual assessment of a specific “case” inside its real-life environment, which is used in this study (Priya, 2021). Paparini *et al.* (2021) stated that case studies are particularly useful when analysing complicated phenomena that are challenging to discern from their context. When researching how students utilise AI tools in education, for instance, it is impossible to isolate their experiences from the institutional context, the instructional strategies, or the classroom setting. Therefore, within a case study, the researcher may investigate the phenomenon and its actual context, providing more thorough and precise knowledge. Yin (2014) lists five primary categories for qualitative case studies: exploratory, descriptive, explanatory, intrinsic, and instrumental. From investigating novel phenomena and providing thorough explanations to elucidating causal links and understanding situations in terms of their distinctive qualities or more general insights, Yin (2014) highlights that these various categories serve diverse goals, which are discussed in depth below.

An exploratory case study examines a subject for which there is limited previous research, often with the goal of posing questions or identifying potential research topics. A descriptive case study focuses on what occurs without necessarily elucidating why, offering a thorough description of a case and its background. An explanatory case study aims to clarify causal connections or the reasons behind specific case events. Instead of generalising findings, an intrinsic case study concentrates on a single example because it is particularly interesting in and of itself. Lastly, an instrumental case study uses a case as a tool rather than the main emphasis to analyse a case, shedding light on a larger problem or improving a theory. As stated in Chapter 1, Section 1.7.1.3, this study employs a descriptive and exploratory case study, focusing on public health students at a HE institution. This case study design was used to examine the integration and experience of AI technology in public health education within a specific context. The exploratory element enabled the discovery of new themes and patterns, while the descriptive focus facilitated a thorough description of the participants' experiences within this restricted educational setting. These techniques enable a thorough examination of students' experiences with AI integration in teaching and learning, yielding findings that can inform the development of broader educational practices and policies.

A thorough explanation of the research methods used in this study is given in the section that follows. On a larger scale, the research type acts as the overall blueprint that directs the collection, analysis, and interpretation of data to answer the research questions. The study guaranteed rigor and coherence by clearly connecting the design to the methodology, proving that the selected approaches are suitable for the paradigm and goals of the research. Research methods draw attention to how the study ensured trustworthiness as well as how the methodology aligned with the interpretivist viewpoint, which aims to understand participants' lived experiences in light of their social surroundings.

4.5 RESEARCH METHODS

Within qualitative research, the design provides the structure for thoroughly examining complex phenomena, and the methods are how data are gathered in accordance with that structure (Turhan, 2019). By outlining how, from whom, and in what format the data is gathered, the methods operationalise the design, which establishes the study's focus, breadth, and methodology for understanding participants' experiences (Lim, 2025). As introduced in Chapter 1, Section 1.7, research methods are the precise strategies, tools, and procedures used by researchers to gather, analyse, and interpret data in a systematic manner to answer a research question or achieve research objectives (Pandey & Pandey, 2021). These procedures are essential to the research process since they ensure that the study is conducted in a logical, dependable, and valid manner. This section explains the methods used to interview participants, allowing for freedom in their answers while purposefully immersing themselves in their lives and examining their contextual circumstances (Billups, 2019).

Following a brief introduction, the following section begins by describing the study's research site. This is followed by an explanation of how the participants were chosen and the sampling techniques employed. The chapter concludes with an explanation of the data collection methods, data analysis, ethical consideration and trustworthiness.

4.5.1 Research Site

The study's research site was a residential university located in South Africa that also offers DE and blended learning programmes, which are integral to its teaching and learning approach. These approaches blend traditional in-person instruction with online learning tools, providing students more options for obtaining course materials and participating in academic activities. This university is regarded as a major public research institution as well as one of Africa's most prominent and historically significant

universities, having been recognised for its academic achievements, research output, and social impact. The South African School of Mines (1896) laid the groundwork for the university, which was founded in 1922. This university is routinely regarded as one of Africa's finest universities (Murray, 2022). It is well known for its research and contributions to various disciplines, including medicine, engineering, science, and the humanities. The university provides a wide range of programmes through its faculties, which include Commerce, Law, and Management; Engineering and the Built Environment; Health Sciences; Humanities; and Science. Each faculty includes various schools that offer specialised training and research possibilities. The institution conducts research in several areas, including public health, climate change, and AI. Along with chances for student involvement through organisations, groups, and community outreach programs, it provides academic resources, including libraries and labs.

As of the 2023/2024 academic year, the institution had a total student enrolment of 42,189 students, with 59.2% being female and 38.3% enrolled in postgraduate studies. Additionally, 72.8% of the students were African, while 7% were international students.

4.5.2 Selection of Participants and Sampling Procedures

The study population consisted of South African university students pursuing a PGDip, MSc and PhD degree in public health. These participants were deemed suitable for investigating AI integration in HE since they utilised AI tools in their academic pursuits. Postgraduate students were included in the population to represent a variety of viewpoints and experiences. They were the study's target audience due to their advanced academic experience, having been exposed to more independent research and being more likely to utilise AI tools for writing, data analysis, and literature reviews. The sample was restricted to this group to ensure the depth and relevance of understanding regarding the integration of AI in learning and research contexts in HE. This aligned with the purposeful

nature of qualitative research, which requires participants to contribute deep, thorough, and relevant insights about the research subject (Bazen *et al.*, 2021).

According to Moser and Korstjens (2018), qualitative research includes a variety of approaches for gathering in-depth information, such as interviews, focus groups, observations, and document analysis. In this study, convenience and purposive sampling were employed to identify participants who were easily accessible and provided rich information. Purposive sampling was used specifically to select those who could provide clarification on questionnaire responses for interviews and address the primary and secondary research questions outlined in Chapter 1, Section 1.7.2.1. Convenience sampling did not require random selection and necessitated quick and simple access to participants. Gathering responses was possible since the participants were available and willing to participate in the study. Instead of requiring generalisability to a larger population, the study focused on learning from a specific group.

The researcher gathered data from students enrolled in postgraduate diploma programmes, honours programmes, master's degrees, and doctoral programmes in public health studies at various university schools. As a result, the participants in this study added relevance and value to the study as they are directly involved in learning in the digital era, which makes them particularly relevant to the research topic and renders their insights especially significant. The study's focus on education, learning settings, and technology adoption made the participants' opinions important.

The online questionnaire was distributed via convenience sampling, which allowed the researcher to connect with students who were available and willing to take part. The questionnaire was distributed to 20 public health students enrolled in honours, postgraduate diploma, master's, or doctoral programmes during the study period. The researcher first asked the School's administrators to distribute the questionnaire for the study. Administrators followed up numerous times, but received slow responses, and the

researcher was included on all correspondence. Consequently, the researcher followed up with the participants directly after obtaining their contact information from the administrators. Sixteen of the 20 individuals responded, and the researcher then proceeded to data analysis.

Following data analysis of online questionnaire, seven participants were chosen for follow-up interviews utilising purposive sampling. Interviews were conducted in response to the analysis of the online questionnaire and to obtain clarification from the participants. To be eligible, participants had to (i) be officially enrolled in one of the programmes that were listed, (ii) have answered the questionnaire, and (iii) agreed to be interviewed. This entailed selecting participants with specific attributes that enable the exploration of the study phenomenon and gaining access to participants with knowledge based on their experience or expertise (Karunarathna *et al.*, 2024). The study utilised characteristics such as age and gender to help the researcher understand the range of opinions within the study. Although gender was recorded in the demographic data, it did not significantly impact the research findings.

The study included 16 public health students, comprising two honours degree participants, two postgraduate diplomas (PGDip), nine Master of Science (MSc) students, and three PhD candidates (see Chapter 1, Section 1.7.2.1). To ensure transparency regarding the selection procedure, participants were selected based on their initial acceptance of an invitation to participate in the study. The reason for having two PGDip, two honours and nine masters students was that those studying for these degrees also undertake coursework and research. The PhD participants offered research-based perspectives on the application of AI in programmes that are entirely focused on research. Their viewpoints, when paired with those of honours, PGDip, and master's students, provided a varied and rich understanding of AI integration in coursework and research-based postgraduate environments. By combining these groups, the study was able to investigate how AI is used, experienced, and perceived in various learning formats,

yielding more complex and nuanced results that represent the range of postgraduate educational experiences. The appropriate sample size for qualitative research is determined by the research goals and the need to capture a variety of in-depth perspectives, rather than by a predetermined number of participants, unlike quantitative research, where sample size is often selected in advance (Subedi, 2021).

Initially, all 16 participants filled out an online questionnaire, which was analysed to detect trends, depth, and richness of responses. Out of the 16 participants who responded to the questionnaire, seven stated they were available for the interviews, and nine reported they could not attend the follow-up interviews due to their busy schedules. The interviews sought to elicit participants' thoughts on the integration of AI into HE, their perceptions of its educational usefulness, and the ethical implications of utilising AI tools. The interviews provided contextually relevant data and clarified issues for further clarification found in the original questionnaire.

4.5.3 Research Methods

This study employed a qualitative research approach to investigate students' experiences with AI in public health education, utilising online questionnaires, semi-structured interviews, and document analysis. An in-depth investigation of the subject from several angles was made possible by the combination of these approaches. Below is an explanation of each of these tools and their use in this study.

4.5.3.1 Open-ended questionnaires

Questionnaires ensure that all participants are asked the same set of questions in the same way, which improves consistency and decreases bias. Furthermore, questionnaires enable researchers to collect data from multiple participants within a short period, particularly when conducted online or in written format (Braun *et al.*, 2021). Despite their

limitations, they enable effective comparison of participants' responses. Open-ended questions predominated in the study's questionnaires (see Appendix A). Lim (2024) highlighted that the rich and nuanced comments participants can provide, because of this design, offer deeper insights into their ideas, experiences, and viewpoints. Hadler (2023) argued that participants freely express themselves and provide further detail when the researcher uses open-ended questions, as opposed to closed-ended ones that restrict responses to predetermined possibilities. This method enhanced the calibre and breadth of the study's findings by illuminating intricate subjects, revealing fresh concepts, and understanding the background or justification for participants' opinions.

Participants were free to share their opinions and experiences regarding the integration of AI in HE, given the format of the questions. Osborne and Grant-Smith (2021) noted that open-ended questions encourage participants to express important yet unexpected themes, allowing their responses to be both meaningful and honest. These questions enabled participants to share insights rooted in their personal experiences, leading to a deeper and more genuine understanding of their perspectives on integrating AI in higher education. This strategy aligns with qualitative research, which prioritises understanding phenomena through participants' subjective, complex, and contextual experiences (Wainstein *et al.*, 2023). Wolff *et al.* (2019) posited that the foundation of qualitative approaches is open-ended inquiries, which enable in-depth investigation of unforeseen problems and yield rich, genuine data that represents the participants' actual experiences.

Additionally, the questionnaires revealed the participants' experiences and highlighted practices they applied when utilising AI in their education to achieve positive outcomes in their studies. Questionnaires for this study were sent to twenty students who were participants in public health studies. Participants were invited via email, which explained the study, assured confidentiality, and emphasised voluntary participation. Of the 20 individuals contacted via email, 16 eventually responded after several follow-up reminders, which was sufficient for the study as mentioned in Chapter 1, Section 1.7.2.2.

Although participants were initially given two weeks to complete the questionnaire, some required additional time due to work, study, and other commitments. The researcher also carried out a pilot study for the questionnaires, as outlined below.

Piloting and Implementing the Questionnaire

To determine if the questions needed revision, the study first conducted pilot research with five individuals not involved in the study. Williams-McBean (2019) reported that a pilot study helps researchers refine and clarify their research questions and objectives as well as assess the viability and applicability of their goals. After the participants in the pilot study had completed the Google Forms questionnaire, the researcher knew what needed to be changed to prepare the online questionnaire for distribution to the participants. The pilot study helped the researcher to improve the questionnaire by identifying any ambiguous or unclear items. Malmqvist *et al.* (2019) defined a pilot study as a small-scale, preliminary study undertaken before the main research study, with the objective of testing the feasibility, design, methods, and procedures of the intended research to detect potential difficulties and modify the approach. The five students who participated in the pilot study were enrolled in various courses, including economic and management sciences, education, and the humanities. The open-ended questionnaires were sent to students via email, and this pre-test or pilot study helped in the study by enabling participants to offer feedback as discussed in Chapter 1, Section 1.7.2.

Besides ensuring a user-friendly format and layout, the questions were clear, relevant, and concise. All leading or unclear questions were clarified, and the completion time estimate was reasonable. The five non-participants stated that they completed the questionnaire in under 30 minutes and found the duration sufficient for providing their responses. For maximum efficacy, the questionnaire was improved based on input from the pilot study. In Question 1, “What effects has the use of AI had on your education in public health studies?” for instance, one of the participants from the pilot study proposed that offering a response guide would improve consistency during analysis and increase

clarity for participants. The inclusion of multiple-choice questions like “Had a great effect”, “Had an adequate effect”, or “Had no effect” was also recommended by the non-participant. Participants were then asked to expound on their selection utilising an open-ended prompt. As evidenced in Chapter 5, Section 5.3.1.1, this recommendation was incorporated in the updated questionnaire, thereby improving the interpretability of the responses and the breadth of the qualitative insights gleaned.

The success of this study is determined by the efficacy, and clarity of the questionnaire’s items and instructions with reference to the primary and secondary research questions (Zhang & Aryadoust, 2022). The researcher ensured that the participants understood the purpose of the questionnaire by outlining the significance of participating in the pilot study and explaining how their input would help the researcher make any necessary revisions or enhancements. Additionally, the researcher emphasised to the pilot study participants the importance of maintaining response anonymity and confidentiality. The researcher also provided participants with explicit instructions on how to complete and submit the pilot study questionnaire and offered assistance with any questions or technical difficulties as needed. After completing the pilot study, the research involved 16 public health students.

4.5.3.2 Semi-structured interviews

Semi-structured interviews are used in research to collect qualitative, in-depth data while allowing for some degree of flexibility (Adeoye-Olatunde & Olenik, 2021). Naz *et al.* (2022) noted that semi-structured interviews involve a series of pre-planned questions, but the interviewer is free to go deeper into subjects based on the participant’s answers. Additionally, interviews allow participants and interviewers to connect in person while both parties are physically or virtually present in the same area. The semi-structured interviews offered flexibility to modify and investigate further, enabling a deeper examination of participants’ experiences and elucidation of questions that arose from the questionnaire,

even while the questionnaire remained fixed and organised for consistency. Exploratory investigations greatly benefit from semi-structured interviews because they offer the depth and nuance required to comprehend complex situations that questionnaires cannot (Karatsareas, 2022). A crucial methodological element, the semi-structured interviews allowed for triangulation with the questionnaire data, bolstered the trustworthiness of the results, and offered deep, contextualised insights into students' experiences with AI in higher education (Romano *et al.*, 2024).

The study used an interview schedule (see Appendix B) during the interview session. Participants were permitted to raise any unforeseen or unplanned concerns related to the research themes during the semi-structured follow-up interviews. Following the completion of the questionnaire, semi-structured follow-up interviews were held. To gain a more in-depth understanding and clarity on specific subjects, the interview questions were formulated based on the participants' responses to the questionnaires. The questionnaire data were analysed before the interviews were conducted to make sure the preliminary findings informed the interviews. This method shows a methodical and responsive research procedure, which improves the study's credibility and rigour.

Each of the seven participants' interviews lasted roughly 30 to 45 minutes, were conducted individually utilising Microsoft Teams, were recorded with their permission, and were transcribed by MeetGeek. In addition to the open-ended questions used to create the interview schedule, the research questions provided a basis for exploring a broader range of perspectives.

4.5.3.3 Document analysis

An applicable guiding document relevant to AI was selected and included in this study for analysis, namely the guidelines for the use of generative AI in learning, teaching, and research. This single guideline was adopted to guide the document's analysis. Asdal and

Reinertsen (2021) define document analysis as the process of studying and evaluating a text, videos, learning management systems or a collection of documents, etc. Document analysis often involves multiple processes to extract significant information, assess document quality, and understand its implications (Morgan, 2022).

Choosing the appropriate guideline was driven by the topic and the location of the guideline, since the researcher was seeking the most recent version, which was issued in 2024. The researcher employed the 2024 AI guidelines for document analysis from the study location, as there was no 2025 policy that addressed the use of AI. Fellows and Liu (2021) argued that selecting a research topic is one of the most important stages in the research process, as it determines the project's overall direction, scope, and potential results. Researchers select topics that are immediately relevant so that their findings can influence current discussions, the creation of new laws, or advancements in technology (Lim, 2024). The policy document was specifically chosen for its relevance to the topic of AI integration in higher education in a specific context. The document analysis was included in this study as part of the triangulation process, with the goal of providing converging evidence that enhances the trustworthiness of the conclusions (Dawadi *et al.*, 2021). This strategy reduces potential biases by integrating multiple sources of data, hence increasing the overall trustworthiness of the research (Zhu & Salimi, 2024).

As explained in Chapter 1, Section 1.7.2.2, the analysis included one AI guideline from the university, titled "Guidelines for Generative AI Use in Learning, Teaching, and Research". The faculty's Research Administration provided access to the university's guidelines on the use of generative AI in learning, teaching, and research. A checklist was utilised to systematically analyse data from these publications. Below is an example of the checklist used.

Table 4.2: Checklist for Data Analysis

Item	Yes / No / Partially	Notes / Observations
Scope and Purpose	Yes	Does the guideline clearly state its purpose and scope?
Definition of AI	Yes	Are key terms such as “generative AI“ defined?
Permitted Use	Yes	Are acceptable uses of AI in teaching, learning, and research specified?
Prohibited Use	No	Are specific restrictions or prohibitions outlined?
Academic Integrity	Yes	Does the guideline address plagiarism, authorship, or originality?
Data Privacy and Security	Yes	Are rules for handling personal or sensitive data included?
Transparency Requirements	Yes	Are students and staff required to disclose AI use?
Evaluation and Assessment	Yes	Are there instructions for how AI-influenced work should be assessed?
Compliance and Accountability	Yes	Are there consequences for non-compliance specified?
Support and Resources	Yes	Does the guideline provide guidance, examples, or support resources?
Review and updates	Yes	Does the guideline specify review periods or update procedures?

4.6 DATA ANALYSIS

Data analysis is the process of methodically examining and analysing data to identify patterns, draw meaningful conclusions, and inform decision-making. Data must be arranged, transformed, and modelled to obtain insights that can guide corporate plans, research findings, and other goals (Akter *et al.*, 2023).

In this study, Google Forms was used to collect participants' responses to an online questionnaire. Participants received a questionnaire with 15 questions to ensure a variety of answers that represented different viewpoints pertinent to the study's aim and objectives. A few closed-ended questions were also used to collect biographical and factual data on participants, including age, gender, academic standing, and field of study. Closed-ended questions made it possible to gather data uniformly and efficiently while guaranteeing that each participant's responses were clear and consistent. The depth of answers is more important in qualitative research than the quantity; however, since the 15 questions were designed to elicit in-depth, considered answers, this number was regarded as adequate (Hamblin, 2025). The participant sheet, consent documents, and a link to the online questionnaire were sent to participants via email by the researcher and school administrators (Section 4.5.2).

Following the collection of data through the online questionnaire, semi-structured interview data were processed and analysed. The data was analysed utilising thematic analysis. The researcher identified and defined themes as specified in Chapter 5, Section 5. Each theme was named specifically to capture the essence of the information it represents. The researcher provided a concise description of the meaning and scope of each theme. The theme titles and descriptions made it easier to group and analyse the findings. The purpose of the independent data analysis was to find themes that supported and aligned with the study's core goal. As a result, thematic analysis is a popular technique for examining qualitative data, offering a methodical approach to identify,

organise, and understand patterns or themes within a dataset (Christou, 2022). Trainor and Bundon (2021) posited that thematic analysis enables researchers to collect participant experiences, perceptions, and perspectives in an organised manner while also delving deeper into meanings, relationships, and underlying patterns. Therefore, the researcher in this study was able to delve deeper into the meanings, linkages, and underlying patterns in the participant replies by utilising thematic analysis to go beyond the surface-level data. This methodology facilitated a methodical and organised examination, ensuring that the experiences, viewpoints, and reactions of the participants were recorded and interpreted in a manner consistent with the research goals. By recognising and characterising themes, the researcher found information that directly complemented the main objectives of the study and offered a deeper comprehension of the phenomenon being studied. The presentation and discussion of the findings are influenced by the study methods. While thematic analysis may produce a report structured around themes or categories drawn from the data, case study research, for instance, may concentrate on detailed individual or organisational case descriptions.

This study used the six steps as shown in the figure below (Braun and Clarke, 2006):

Figure 4.1: Six-Phase Framework of Thematic Analysis

As introduced in Chapter 1, Section 1.7.3, Step 1 refers to gaining an understanding of the data; this study created a thorough understanding of it, ensuring that no important details were overlooked (Braun & Clarke, 2006). This initial engagement laid the groundwork for a thorough analysis. In this study, the researcher followed this procedure by carefully examining all interview transcripts, open-ended questionnaire responses, and documents numerous times. Initial notes were gathered to identify recurring trends, notable words, and developing difficulties with the application of AI in HE. This recurrent interaction with the raw data ensured that the researcher remained immersed in the participants' voices and circumstances, establishing a solid foundation for uncovering codes and themes while not overlooking key information. Creating codes divides the data into manageable chunks (Braun & Clarke, 2021). The two authors further explained that coding ensures that the analysis is systematic, which aids in breaking down enormous datasets into smaller, more relevant pieces for subsequent research. Initial codes for this study were manually created by the researcher, utilising documents, open-ended questionnaire answers, and interview transcripts. Finding themes enabled the researcher to uncover patterns and repeating concepts within the data. Themes distil the core of the participants' experiences and connect them to the study's aims. The researcher accurately analysed patterns and connections among the initial codes to find more comprehensive categories that captured important facets of the material. Reviewing themes ensures that the data is appropriately represented. This stage increases the reliability and credibility of the findings by validating that the suggested themes are supported by the dataset. The researcher reviewed the coded excerpts within each theme to see if they formed a logical pattern and accurately reflected the participants' experiences. Simultaneously, other topics that were overly broad were divided into sub-themes to improve clarity.

The themes were also cross-checked against the complete dataset of questionnaire responses, interviews, and document analyses to ensure they conveyed the overall story of the data without omitting crucial insights. Refining themes clarified the significance and

breadth of each theme. This method ensures that the themes are unique, consistent, and relevant to the research objectives, resulting in a more polished and useful analysis. The researcher carefully evaluated all coded extracts under each subject to ensure that they consistently reflected the same thought. Where extracts did not fit, they were either eliminated or moved to more appropriate themes. The wording of the themes was revised to ensure that they were explicit, unambiguous, and did not overlap with one another. For example, the initial theme, “Perceived Advantages of Utilising AI”, was broken into two sub-themes, “AI in the Classroom” and “Improving AI’s Applicability in Education”, as participants’ responses highlighted many challenges as discussed in Chapter 5, Section 5.3.1.3. This refining process ensured that the themes were well-defined, distinct, and clearly addressed the study objectives, all while adhering to the interpretivist paradigm of documenting participants’ lived experiences. Themes are categories that summarise the important findings while offering extensive detail to answer the study questions. Some findings were illustrated with explicit quotes from participants to provide actual proof of their points of view, while others were summarised or paraphrased to convey the main significance of the comments. The researcher divided the findings into categories based on the major topics, emphasising patterns, similarities, and variations among participants. The results were analysed utilising the theoretical framework, specifically the TAM and connectivism, to explain how participants’ perspectives influenced their use of AI in HE. Visual representations, such as tables or figures, were used when appropriate to summarise patterns or relationships in the data, making the results more accessible and understandable.

4.7 ETHICAL MEASURES

West (2020) posited that research integrity, credibility, and fairness are all dependent on ethical measures, which include values and procedures that safeguard participants’ rights, welfare, and dignity while upholding the trustworthiness of the research process. In accordance with these ethical guidelines, the researcher informed participants fully

about the study and made it clear that there would be no immediate benefits to their participation. Furthermore, it was emphasised that declining to participate would have no negative consequences.

The researcher applied for ethical clearance from UNISA, the institution he was registered with (Appendix C). After obtaining this clearance, the researcher went to the institution where the participants were registered to apply for clearance. There, the researcher was granted permission by the Faculty Registrar (Appendix D) to contact public health students; however, the Faculty Registrar clarified that this could only be done after obtaining clearance from the Deputy University Registrar. As a result, the researcher applied for and received clearance from the Deputy University Registrar (Appendix E).

Individual interviews with students were conducted in accordance with consent and participant letters (Appendix F). These letters explained the study's goal, the participants' voluntary involvement, and the benefits of the research, and provided details regarding the interview process, including permission to audio-record the sessions. The letters also addressed confidentiality, emphasising the importance of participant privacy and informing them of their ability to withdraw from the study at any time. These precautions played a crucial role in maintaining the ethical duty to reduce harm while honouring the autonomy and welfare of research participants.

The researcher ensured that no data was falsified by conducting the study with integrity, professionalism, and respect for ethical norms. The study's goal and expectations for the participants were explained in detail. Pseudonyms were used to ensure confidentiality, and participants were informed immediately that their involvement was entirely voluntary and that they could withdraw at any time. Ahmad (2023) defined confidentiality as the moral and legal obligation to prevent the disclosure of personal information that people have shared without their consent. Participants' trust in experts or researchers is increased by confidentiality. When participants believe their information is secure, they

are more inclined to divulge sensitive, truthful, and comprehensive information (Cooper *et al.*, 2023).

The ethical measures approach is significant because it protects participants' identities and ensures that their replies cannot be linked back to them, encouraging honesty and openness when discussing their experiences (Creswell & Creswell, 2017; Bryman, 2016). Maintaining anonymity is a critical ethical requirement in qualitative research as it protects participants from potential harm or negative consequences resulting from the disclosure of sensitive information. By anonymising participants, the study upheld ethical norms, strengthened the researcher-participant relationship, and promoted the integrity and trustworthiness of the collected data.

4.8 TRUSTWORTHINESS OF THE STUDY

A key component of qualitative research, according to Hayre (2021), is a study's trustworthiness, which guarantees that the results are reliable, confirmable, transferable, and trustworthy. Trustworthiness is established through specific design and methodological techniques. The study was conducted with these factors in mind, and several measures were taken to enhance the study's trustworthiness. Qualitative researchers employ a range of techniques to enhance the study's trustworthiness, including demonstrating its dependability, confirmability, transferability, and credibility (Bonus *et al.*, 2025). The discussion of these trustworthiness metrics follows.

4.8.1 Credibility

In qualitative research, credibility refers to the principle that the results are trustworthy and accurate (Coleman, 2022). Additionally, credibility guarantees that the study methodology and data interpretation are reliable and solid, and that the outcomes accurately represent the experiences and viewpoints of the participants (Cypress, 2021).

Establishing credibility is crucial for proving the trustworthiness of qualitative research, according to Hayashi *et al.* (2019), as it ensures that the study accurately reflects the participants' realities and the environment in which it was conducted. Liao and Hitchcock (2018) identify several credibility tactics that qualitative researchers might use, including member checking or peer debriefing, triangulation of study results, extended field experience, and pilot testing of research instruments. These tactics, described in more detail below, were employed by the researcher in this study to enhance the trustworthiness of the data and study conclusions. The researcher conducted a pilot study, triangulation, and member checking to provide a detailed account of the phenomenon being studied, ensuring trustworthiness in the specific representation of public health participants. The legitimacy of the qualitative study was ensured by providing detailed descriptions of the participants, themes, and categories derived from the data analysis.

4.8.2 Transferability

Transferability in qualitative research refers to the extent to which a study's findings can be applied or are relevant in other settings (Swinton & Mowat, 2016). Drisko (2024) posited that transferability is comparable to generalisability in quantitative research, but instead of emphasising statistical extrapolation, it concentrates on how findings might be applied to comparable circumstances. As stated in Chapter 4, Section 4.5.2, convenience sampling was one of the techniques employed in this study, facilitating the recruitment of participants and ensuring the collection of rich, relevant data from students who were readily accessible and eager to participate. Purposive sampling was employed for the follow-up semi-structured interviews to select participants who could elaborate on their questionnaire responses and provide more in-depth insights into the research question, as stated in Chapter 1, Section 1.7.2.1. Convenience and purposive sampling were utilised for the online questionnaire. Additionally, thorough and detailed explanations of the research procedure, which clearly outline the methodologies used for data collection

and analysis, enable the study to be carried out in comparable settings. According to Udensi (2019), a case study with embedded components, such as this one, enhances the generalisability of the findings.

4.8.3 Dependability

Dependability in qualitative research refers to the consistency and stability of the research process over time (Dzogovic & Bajrami, 2023). Lincoln and Guba (1985) argued that dependability guarantees the trustworthiness of the study's conclusions as well as the rationality, traceability, and thorough documentation of the research procedure. Although it stresses the qualitative setting where social phenomena and human behaviour can fluctuate, dependability is similar to reliability in quantitative research (Haq *et al.*, 2023).

The researcher ensured that the research procedure was thoroughly documented throughout Chapter 4 to maintain the study's traceability when needed. Google Forms, recorded videos, and audio files from MS Teams comprised the data collection, and the information was transcribed to enable inquiry audits to be established at any time.

4.8.4 Conformability

The degree to which a study's conclusions are influenced by the participants and the data rather than the researcher's prejudices, motives, or personal viewpoints is known as confirmability in qualitative research (Prosen, 2022). By integrating interviews, observations, and document analysis, this study ensured that the conclusions were informed by participants. This study's use of triangulation reduced the possibility of bias by ensuring that conclusions are backed by a variety of viewpoints. The foundation of confirmability in qualitative research is the recognition that research is never objective (Maxwell, 2021). Findings should, to the greatest extent feasible, reflect the circumstances under investigation rather than the researcher's opinions, hypotheses, or

prejudices. This is the primary concern of confirmability. Klenke (2016) argued that conformability is one of the standards for reliability in qualitative research, guaranteeing that the findings are supported by the data and verifiable by others.

The study's researcher ensured that the findings accurately reflected and interpreted the participants' answers (Lincoln *et al.*, 2011).

4.9 CHAPTER SUMMARY

In this chapter, the research methodology was examined as the overarching plan and structure that directed the investigation. The chapter described its methodology, including the data collection and analysis strategy. This approach further guaranteed the study's rigour, methodical approach, and credibility. The study design, techniques, instruments, and procedures were all defined by the research methodology, which serves as the basis for the entire research process. This chapter provides a detailed overview of the research site, sample plan, and data collection and analysis techniques. Additionally, the justifications for the selection of the design and methodologies were provided. The chapter also discussed the ethical issues surrounding research utilising human subjects. The chapter concluded with a summary of the methods employed to ensure the trustworthiness of the research, which was followed by a discussion on the research's credibility.

The next chapter will present the findings and their discussion.

CHAPTER 5: FINDINGS AND DISCUSSION OF THE EMPIRICAL RESEARCH

5.1 INTRODUCTION

The previous chapter described the methodology used for this study. The chapter also explained the reasoning for data collection, storage, and analysis. Furthermore, the chapter provided an outline of the empirical elements that underpin this research. This chapter presents the research findings and the discussion of the findings. The purpose of this chapter is to thoroughly examine the data collected from 16 student participants on their experiences with the integration of AI in public health within HE in South Africa. The research findings highlight the participants' profiles as well as the themes and subthemes that arose from the interview questions. The discussion of the analysed document centres on the guidelines for the use of generative AI in learning, teaching, and research. This chapter includes a summary of the findings.

Figure 5.1 and the discussion below depict the procedures used by the researcher to collect and analyse data.

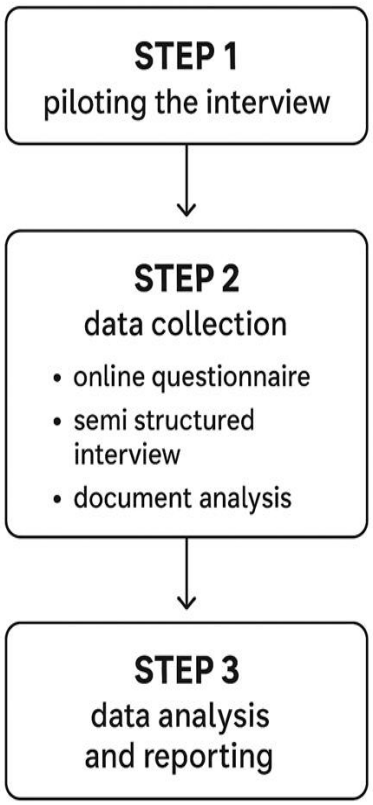

Figure 5.1: Contextualising the Research Process

In the first step, the researcher conducted a pilot study, from which the comments and suggestions received were used to revise, reword, and sequence the questions as described in Chapter 4, Section 4.5.2 and 4.5.3.1. Thus, the quality of the interview questions was significantly enhanced by the pilot study. In the second step, participants' information was gathered utilising an online questionnaire on Google Forms, semi-structured interviews, and document analysis. As a result, following the completion of an online questionnaire and analysis of the data, interviews were conducted whenever a participant was available to provide clarification, as needed. The literature, research questions, and study objectives guided the concurrent processes and activities that

composed the data collection phase. The literature review served as a basis, outlining the current understanding, pointing out knowledge gaps, and guiding the choice of suitable data-gathering techniques. To ensure that the data collected properly addressed the study's questions, the research questions established the precise focus of the data collection. The study's goals ensured that every activity was aligned with the overarching objectives of the investigation. Following the online questionnaire and semi-structured interview, the policies were analysed. In step three, the data were analysed, the study findings were interpreted, and the results were written up.

5.2 FINDINGS

The study's findings, based on questionnaires, interviews, and document analysis, are presented in this section. The findings are presented as themes, and the topic is further supported by direct data. This section begins with a brief overview of the questionnaire and interview procedure, providing context for the results. While the research strategy and data collection were thoroughly covered in Chapter 4, the findings are the focus of Chapter 5. The reader is given a clear picture of the study's evidence base in this part, which summarises the findings of the questionnaire and interviews. Key patterns, themes, and insights that directly answer the study questions can be highlighted by the researcher when the data are presented succinctly. Additionally, it ensures transparency in the research process by providing context for the analysis and discussion that follow and demonstrating how the data were gathered and understood. Themes arising from the three ways of data collecting will then be examined as well. This is followed by a discussion of document analysis. This section examines the experiences of students with the integration of AI into public health education (PHE).

The below provides an overview of how the online questionnaire and interviews were conducted in this study.

5.2.1 An Overview of Questionnaires

All participants were encouraged to fill out the questionnaire (see Appendix A). As stated in Chapter 4, Section 4.5.2, questionnaires were sent to 20 public health students and 16 responses were received. Although nine participants were unable to participate in follow-up interviews due to scheduling conflicts, the seven who did offered valuable and thorough information that helped clarify various elements of the study. The questionnaire helped to provide each participant's demographic information as well as how they used AI in their HE studies. The questionnaires and interviews also helped the researcher explore the general problems, ethical implications, and experiences that students encountered while incorporating AI into their higher education studies in the 21st century.

5.2.2 An Overview of Interviews

As stated in Section 4.5.3.1 of Chapter 4, all 16 participants were asked to participate in follow-up interviews after completing the questionnaire. Only seven responded and offered the thorough interview responses and explanations required to answer the research questions, allowing for more in-depth data to be gathered and examined. This study was still able to collect all the necessary information and data, as the researcher had the opportunity to delve further into the participant responses. Seven participants completed the follow-up interview, based on their availability among the 16 participants who completed the online questionnaire (see Chapter 1, Section 1.7.2.1). The focus was on those whose responses required further explanation, to ensure a diverse range of viewpoints and experiences with AI tools. In addition to enabling the collection of full insights, this choice increased the study's reliability and credibility. By utilising this strategy, the researcher was able to get comprehensive and in-depth data from the subjects. Because the data came directly from different sources, this in turn improved the dependability and trustworthiness of the findings by effectively capturing and interpreting the participants' perspectives.

5.3 BIOGRAPHICAL INFORMATION OF THE PARTICIPANTS

The biographical information of the participants is included in Table 5.1 below to provide a grasp of the entity or unit of analysis being studied.

Table 5.1: Summary of Participants' Biographical Profiles

Participant	Gender	Year of Study	Level of Study	Field of Study	Age	Semi-structured Interview
Participant 1	Male	Yos 3	Masters	Epidemiology and Biostatistics	25–29 years	Yes
Participant 2	Male	Yos 3	Masters	Epidemiology and Biostatistics	25–29 years	Yes
Participant 3	Male	Yos 3	Masters	Rural Health	30–39 years	Yes
Participant 4	Male	Yos 4	Masters	Exposure Science	30–39 years	Yes
Participant 5	Female	Yos 1	Masters	Epidemiology and Biostatistics	30–39 years	No
Participant 6	Female	Yos 1	Honours	Public Health	30–39 years	No
Participant 7	Female	Yos 2	PhD	Paediatrics and Child Health	30–39 years	No
Participant 8	Female	Yos 2	PhD	Public Health	40–49 years	Yes
Participant 9	Male	Yos 3	Masters	Rural Health	40–49 years	No

Participant 10	Female	Yos 3	Masters	Exposure Science	30–39 years	No
Participant 11	Male	Yos 1	Masters	Epidemiology and Biostatistics	40–49 years	No
Participant 12	Female	Yos 1	Honours	Public Health	30–39 years	No
Participant 13	Female	Yos 1	PhD	Public Health	30–39 years	No
Participant 14	Male	Yos 1	Masters	Epidemiology and Biostatistics	21–24 years	No
Participant 15	Male	Yos 1	PGDip	Tropical Medicine and Hygiene	21–24 years	Yes
Participant 16	Female	Yos 1	PGDip	Tropical Medicine and Hygiene	40–49 years	Yes

For this study, postgraduate students were chosen to provide information on their experiences at various stages of academic development. These students were involved in a variety of educational and research endeavours, ranging from programmes that emphasise coursework (PGDip and honours) to those that focused on research (master's and PhD). Including data from different levels enhanced information, making it easier to identify trends or differences in postgraduate education.

The participants ranged in age from 21 to 49 years old and were in their first to final year of study, which was their fourth year. However, this had no bearing on the research findings. In compliance with research ethics, participant numbers were utilised instead of their names, and their identities were kept secret. Based on their responses to the questionnaire, it became evident that every student had prior experience utilising AI. Because of this, every participant had some sort of relevant understanding of the

applications of AI, which helped the researcher to obtain the information required for this study.

Furthermore, Table 5.1 above provides information about the interview participants and the questionnaires used for data collection. Data collection instruments reflect public health interviews with participants who completed questionnaires, as well as those who were unable to participate in semi-structured interviews. The questionnaire was completed by 16 students: nine master's, three PhD, two honours, and two PGDip students. The variance in participant numbers among degrees had no impact on the study's ability to collect the necessary information to address the research questions. Most of the PGDip students were medical doctors who were frequently based in hospital wards. When the researcher followed up to encourage completion, many cited their demanding schedules as a barrier, which made it difficult for them to complete the questionnaire. Seven of the 16 participants chose to be interviewed via Microsoft Teams or via phone.

5.3.1 Themes Derived from Questionnaires and Interviews

Participants were given the opportunity to share their experiences with AI for learning, as well as its advantages and disadvantages, ethical considerations, and any AI tools they had used in their studies, in both the questionnaires and the interviews. The ability to recognise and evaluate patterns of meaning (themes) in the data makes thematic analysis an essential component of qualitative research (Braun & Clarke, 2022).

Table 5.2 indicates that the analysis of the questionnaire and interview responses identified several important themes that represent the participants' experiences and opinions regarding the integration of AI use in education. The themes mentioned below and the ensuing discussion were the result of recurring concepts and patterns identified in the data. Consequently, the following discussion examines the theme of enhanced

access to educational materials, with an emphasis on real-time information access via AI-driven learning.

Table 5.2: Synopsis of Themes Derived from Questionnaires and Interviews

Themes	Sub-themes	Theories Supporting the Themes
1. Enhanced Availability of Educational Materials	Access to real-time information	TAM theory Connectivism theory
2. The Most Common AI Tools	Student perceptions and satisfaction with common AI tools in the digital age	TAM theory
3. Perceived Advantages of Utilising AI	AI in the classroom Improving AI's application in education	TAM theory
4. AI Adoption Challenges		TAM theory
5. Concerns About Academic Integrity and Ethics		TAM theory Connectivism theory
6. Provision of Resources and Support		TAM theory

5.3.1.1 Theme 1: Enhanced Availability of Educational Materials

The first theme explored how participants experienced AI and digital technologies enhancing access to learning resources. Investigating this theme was critical for understanding its potential impact on the research problem and developing future research questions. One important sub-theme emerged from this category: 1.1a) Access to real-time information. This theme and its sub-theme are explained in greater detail based on participants' questionnaire and interview responses.

In relation to this theme, a question was posed to participants: "What effects has the use of AI had on your education in public health studies?" This was followed by a sub-question: "Please explain your choice and how AI has changed your learning experience in public health studies." The sub-question served to elaborate on and provide context for the participants' responses to the question. For the primary question of this theme, participants were asked to select one of four options: (a) Had a great effect, (b) Had an adequate effect, (c) Had no effect, or (d) Had a negative impact. All 16 participants responded to both the multiple-choice question and the accompanying open-ended sub-question, offering insights into how AI has influenced their learning experiences in the field of public health.

Figure 5.3.1 below, generated by Google Forms, illustrates the percentage distribution of participants' responses to the four options presented in the question.

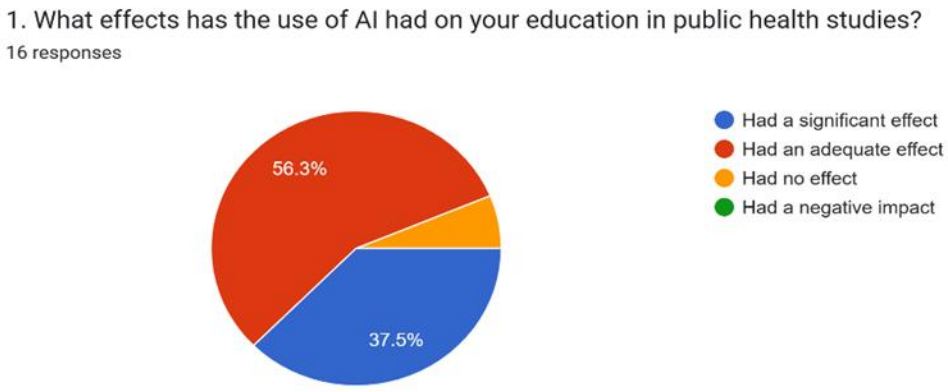

Figure 5.3.1: Effects of the Use of AI on Public Health Education (Google Forms)

Of the participants, 37.5% reported that AI had a significant effect, 56.3% indicated that it had an adequate effect, and 6.3% believed it had no effect. When combined, 93.8% of participants identified AI as having at least some significant impact, showing that the vast majority see AI as beneficial in the context under consideration. The higher proportion claiming some effect can imply that, while AI is widely regarded as useful, many participants believe its influence is moderate rather than transformative. Meanwhile, the 37.5% who identified a significant effect represent a sizable minority, acknowledging AI's significance and illustrating the variety in perceived usefulness. Although 6.3% of participants initially stated that AI had no impact, further investigation during the semi-structured interviews revealed that this opinion varied depending on the task. For example, Participant 16, in a follow-up interview, thought AI was beneficial for coming up with ideas and increasing productivity, but it wasn't helpful for assisting discipline-specific activities or critical academic thinking, which is supported by Alasadi and Baiz (2023) and Vincent-Lancrin and Van der Vlies (2020) (See Chapter 3, Section 1.1), who noted that students can lose their critical thinking ability if they rely on AI technologies without utilising them ethically. The fact that 93.8% of participants said AI had some effect on their studies suggests that AI's influence in education is widely acknowledged. This illustrates AI's expanding effect on current learning experiences. Overall, these findings

indicate that AI is widely regarded as having an impact on student learning, with the degree of perceived influence varying, providing crucial insights into its acceptance and practical application in the education field. These findings are consistent with the TAM theoretical framework in Chapter 2. Esmaeilzadeh's (2020) literature (Chapter 2, Section 2.2.1.2) argued that the extent to which students believe AI tools and applications will improve their learning outcomes and study efficiency can be interpreted as perceived usefulness in the context of AI integration in public health studies. This consensus among study findings indicates that AI is widely regarded as useful and is not restricted to a single environment, indicating a strong and generalisable trend.

From the main question, the following sub-question was asked: 'Please explain your choice and how AI has changed your learning experience in public health studies." The 16 participants who provided answers in the online questionnaires offered a variety of perspectives regarding the effects of AI in education. An analysis of the findings from this theme's sub-question is provided below.

Participants 1–15 indicated that AI benefits public health studies by enhancing learning experiences, facilitating writing and research, saving time, and strengthening professional and academic skills. Many participants believed that AI could enhance access to accurate and relevant information while also improving the efficiency of research. By doing this, students can move from gathering to interpreting and from searching to thinking. The following participants' responses to this theme are mentioned as examples.

Participant 1 indicated that "AI has made things easier, turning learning material into podcasts and practice exams and quizzes, which has made learning more enjoyable." This response gives a clear indication that AI supports diverse formats of materials, improving accessibility and engagement. AI's capacity to transform a single piece of content into multiple formats meets the diverse learning preferences and needs of students. For instance, some students grasp concepts better through visual aids, while

others benefit from auditory explanations. AI-enabled resources, such as narrated courses, podcasts, or spoken explanations, help auditory learners process information efficiently by allowing them to listen (Morzy, 2025). Conversely, with the use of AI, videos can also help students learn at their own pace by allowing them to pause, fast forward, and revisit difficult material, which promotes comprehension (Pellas, 2025).

AI can automate and customise this process, which could otherwise be time-consuming for educators. Participant 2 mentioned that “Before, to access information, we had to go to libraries to read textbooks and journals, but now we just easily find information.” Consequently, prior to the emergence of AI in South Africa and worldwide, students had to physically visit libraries, go through textbooks, and examine journals to obtain information. In addition to being time-consuming, the resources were occasionally outdated or had a narrow focus (Davenport, 2018). Currently, in education, students and educators can quickly look up academic papers, view educational films, or even ask AI systems to explain things. Learning has undoubtedly accelerated and become more efficient due to the use of AI. Participant 3 further stated that “It [AI] supplements my study materials and refines my writing.” Accordingly, the participant’s view of AI as an aiding instructional tool rather than a substitute for conventional teaching techniques is reflected in this statement.

The researcher conducted a follow-up interview with Participant 3 to gain a deeper understanding of her response regarding how AI supplements her study materials and how this process was implemented. The researcher discovered that the word “supplements” suggests that the participant uses both traditional study resources (such as lecture notes and textbooks) and AI to enhance their comprehension. This is consistent with constructivist learning theories, which hold that students actively create knowledge utilising the resources and tools in their surroundings (Zajda, 2021). Participant 4 clearly indicated that “It helps me to improve the way I do modelling.” The participant’s statement suggests that AI significantly improves their modelling practices and abilities. In a follow-

up interview, Participant 4 stated that AI greatly enhances their modelling skills and practices, especially in statistical and epidemiological modelling. This illustrates how AI tools can help students learn and apply sophisticated quantitative techniques, allowing them to process big datasets, model illness patterns, and improve the precision and effectiveness of their analysis. These features are consistent with research showing AI can improve data-driven decision-making and analytical skills in public health education (Khosravi *et al.*, 2024). The verb “improve” conveys a developmental trajectory where the participant felt that their modelling skills have improved or advanced as a result of integrating AI. The comment suggests that users had a positive experience and were becoming comfortable utilising AI tools for conceptual or technical tasks. In line with the PU component of the TAM, the statement exhibits a favourable assessment of AI’s practical usefulness (Davis, 1989). People are more likely to embrace a technology if they think it will improve their performance, according to TAM (Chapter 2, Section 2.2.1). The fact that the participant viewed AI as a useful tool that improves their modelling process in this situation shows that they have accepted the technology and incorporated it into their academic or professional practice.

Participant 5 responded by indicating that:

> the learning process became more dynamic through the use of AI; complex topics became clearer, research moved faster, and difficult data sets were easier to understand. Instead of spending hours decoding information, more time could be spent reflecting on real-world impact and solutions that matter (sic).

This response emphasises how AI is revolutionising the effectiveness, depth, and clarity of learning. According to the participant, AI dramatically reduces traditional obstacles, such as the difficulty of comprehending complex subjects or processing large data sets, creating a more dynamic and engaging learning environment. AI is presented as a tool that simplifies work, enabling students to concentrate on higher-order thinking skills, such as applying knowledge, assessing ramifications, and devising practical solutions, rather than merely processing information mechanically (Chasokela & Hlongwane, 2025). This

change signifies a pedagogical progression in which AI facilitates deeper, more meaningful interactions with knowledge, in addition to cognitive improvements in the learning process.

According to Participant 6, AI gives “easy access to information and references”. This response emphasised enhanced access to scholarly resources, one of the main advantages that Participants 2 and 3 linked to AI. By offering instant access to pertinent data and reference materials, the participant presented AI as a tool that streamlines and expedites the research process. This effectiveness saves time and effort that would otherwise be needed to find reliable sources through manual database searches or library visits. Participant 7 further mentioned that “I’m able to find research papers relevant to my questions more easily.” This response emphasised a further benefit of AI, which is faster access to academic literature that directly addresses the student’s specific study objectives. The participant reported a reduction in the time and effort required to locate relevant resources, suggesting that AI tools (such as search engines, academic AI assistants, or databases with AI integration) enhance both efficiency and relevance in research. The findings of the participants are consistent with the work of Kaswan *et al.* (2024), which argues that AI provides immediate access to valuable insights and information, thereby improving the effectiveness of the teaching and learning process (see Chapter 1, Section 1.10). Participants 2 and 7 both highlighted how AI and digital platforms make knowledge easier to acquire and can replace conventional approaches.

Furthermore, prior to the advent of AI, students relied on manual database searches and library visits to obtain pertinent information (Jia, 2025). As reported by Participant 2, students no longer need to visit libraries to review textbooks and periodicals, as access to information has grown more convenient in the modern era. The participants’ responses support the idea of connectivism (Siemens, 2005), which emphasises learning in a digital age where technology and networks determine access to knowledge. Consequently, the participant’s finding of relevant information supports the theory put forth by Pan *et al.*

(2021) that learning occurs across interconnected systems, with AI acting as an intelligent node in the network.

Participant 8 responded by saying that “AI assists in helping me understand some key terms.” This response emphasises how AI can aid comprehension and conceptual clarity, particularly in academic settings where knowledge of subject-specific vocabulary is crucial. AI tools, such as chatbots, AI dictionaries, and summarisation tools, help students understand complex or foreign phrases. For example, Participant 5 stated that employing AI technologies helps to explain complicated language in academic publications, allowing them to absorb the subject more effectively. Participant 9 stated that AI “helps with brainstorming direction of my written work and how to explore certain topics”. Karanjakwut (2025) found that AI-powered brainstorming tools improved students’ writing outcomes, particularly in process writing instruction. The participant’s perspectives, supported by Karanjakwut (2025), demonstrate how AI is being used in academic writing as a thinking partner or as a tool for idea generation. The participant viewed AI as a tool to assist human thought rather than substitute it. The literature of Alasadi and Baiz (2023) (Chapter 1, Section 1.1) also supports the participants’ views, arguing that it is crucial to use these AI tools responsibly and cautiously, ensuring that they complement human interaction and conventional teaching approaches rather than replace them.

Furthermore, Participant 10 stated:

> I chose to use AI in my public health studies because it enhances efficiency, provides quick access to a wide range of information, and supports data analysis with greater accuracy. AI has transformed my learning experience by enabling me to explore complex concepts through interactive tools, receive instant feedback, and generate insights from large datasets in a fraction of the time. It has also improved my writing and critical thinking skills by offering suggestions, summarising literature, and helping me refine arguments, which has been especially valuable in research and policy analysis.

The participant sees AI as a useful tool that boosts their ability to study, access information more effectively, analyse data, and develop their critical thinking and academic writing skills. AI is thought to be revolutionising education by making complex

ideas easier to understand, providing interactive feedback, and assisting in the rapid extraction of insights from massive datasets. Responses from Participant 10 concurred with those of Participants 2, 9, 4, and 8. In agreement with Participant 2, Participant 11 stated that “Unlike in the past, when students had to visit the library to obtain the information, AI made life easier.” Participant 12 responded by saying that:

> AI platforms have positively influenced my studies by enhancing how I learn, conduct research, and think critically about technology in healthcare. Tools such as ChatGPT, QuillBot, and Writefull have helped me find relevant information quickly and improve the clarity of my academic writing.

The participant demonstrated a constructive and well-rounded application of AI technologies, not only to enhance their research and learning but also to improve academic writing and critical thinking in the healthcare setting. AI tools like Writefull, QuillBot, and ChatGPT are credited with increasing productivity, clarity, and accessibility to pertinent data. As discussed in Chapter 3, Section 3.2.5, Singh (2023) argued that ChatGPT can effectively explain complex ideas across various domains, including physics, mathematics, the humanities, and others. As a result, this resemblance confirms the participants’ analysis. Additionally, in Chapter 3, Section 3.2.5, Jalil *et al*. (2023) highlighted that students can ask questions about any concept they are unsure of and receive comprehensive, intelligible answers. Participant 13 said that AI “helped me put together my work in sequence, but generally I have been a nurse for a decade with massive experience in different departments.” The participant emphasised how AI enabled her to bridge the gap between the requirements of formal academic writing and her significant nursing experience by organising her academic work in a logical order. AI tools helped her structure coherent ideas, despite her extensive practical experience, which made academic assignments easier to handle.

Participant 14 clearly indicated that “AI fast-tracked my understanding of topics, helped me write more concisely and helped with summaries of research papers, which saves me a lot of time. It also helped identify sources that I would’ve missed utilising a traditional

search engine." In addition to supporting the TAM by demonstrating the perceived usefulness and usability of AI tools, Participant 14's comments bear similarities to those of Participants 4, 8, 11, 13, 10, 9, and 1. Participant 15 stated that AI "assisted adequately". He noted that when he was unable to find material independently, he would use tools such as Wordtune and SciSpace to access the necessary knowledge. This indicates tailored academic aid, where AI fills knowledge gaps or addresses access barriers. Participant 16 referred to "easy access to information and references", supporting the notion that AI improves the efficiency and convenience of academic research.

In the follow-up semi-structured interview with Participant 15 regarding his description of AI use as "adequate" in his studies, the participant explained that he deliberately limited his engagement with AI tools due to concerns about potential plagiarism and misuse. This is consistent with the idea proposed by Mulenga and Shilongo (2024) that the ethical conundrums raised by students' use of AI can be linked to plagiarism, which occurs when students submit their own work as original without properly citing their sources (see Chapter 3, Section 3.2.10). Participant 15 further reported utilising AI only occasionally and consciously refrained from relying on it entirely. Furthermore, the participant noted a lack of confidence in navigating the full capabilities of AI, which contributed to only partial utilisation. He suggested that the availability of clear institutional guidelines on how to appropriately integrate AI into academic work would encourage more effective and responsible use, potentially enhancing the role of AI in his studies.

Participants' responses in this theme showed a strong and persistent belief that AI can be used as a teaching and learning tool for public health research and education in general. In comparison to traditional approaches, participants indicated that AI improved their academic work in several ways, such as comprehending complex subjects, organising and improving writing, summarising research, and locating pertinent sources more quickly. In addition to enhancing academic performance, AI tools such as ChatGPT,

QuillBot, SciSpace, and Writefull have helped bridge the gap between formal academic expression and professional experience, particularly for adult students with extensive work histories.

Many participants believed that AI has improved their critical thinking, time management, and level of engagement with their academics. A student's degree of academic engagement is determined by how actively they participate in and dedicate themselves to their learning process. Attending courses, completing assignments, communicating with classmates and lecturers, utilising learning materials, and demonstrating motivation and perseverance are all examples of behavioural, cognitive, and emotional engagement in academic activities (Abuzar *et al*, 2024). In the follow-up interview, Participant 15 also emphasised the use of AI as a tool to enhance learning, pointing out how students engage with learning resources and interact with academic information. The recurring theme in all the responses is that AI serves as a transformative educational companion and support tool, changing the way students study, write, conduct research, and interact with information in public health and related fields.

5.3.1.1a Sub-theme 1: Access to real-time information

This sub-theme emerged from the question "Which aspects of AI tools (e.g. speed, accuracy, customisation, and ease of use) have the greatest impact on your learning satisfaction, and why?" The purpose of this question was to gather insights specifically related to speed and real-time access. All 16 participants completed the question in the questionnaire, and since each of them was able to provide thorough responses, there was no need for follow-up questions during the interviews.

Participants 1 and 4 highlighted the accuracy, speed, and customisation capabilities of AI tools. Similarly, Participant 2 emphasised the tools' speed, ease of access to information online, and the accuracy of search results. Participant 3 described AI tools as user-

friendly and accessible, noting that they are easy to use and designed to accommodate a wide range of users, stating, “There is literally something for everyone.” Accuracy and speed were similarly cited by Participants 1, 2, and 4 as the main advantages of AI tools. These participants agreed that AI technologies provide credible and relevant results, facilitating rapid access to information. Particularly, Participant 2 emphasised that AI offers “accuracy to what you will be searching for”, underscoring the apparent accuracy of AI-powered web search results. This implies a degree of confidence in AI’s capacity to effectively produce relevant and high-quality information. Participant 3 concentrated on the inclusivity and accessibility of AI technologies, characterising them as “user-friendly“ and available to all kinds of users. The statement made by the participant, “There is literally something for everyone,“ confirms that AI addresses the needs of different students. AI has great potential to improve inclusivity as it can modify learning materials and surroundings to accommodate a range of learner demands, including those with disabilities or different learning preferences (Hadinezhad *et al.*, 2024). This illustrates the participants’ perception of AI as an intuitive, democratic technology that facilitates individualised learning and engagement.

Participant 5 indicated that:

> For me, the biggest game changers are customisation and speed. I like how some AI tools actually adjust to the way I think and work, especially when I’m creating visuals or experimenting with animation. It feels less like using software and more like working alongside something that understands my process. The speed is also a huge plus; instead of spending hours on the basics, I can quickly move through drafts and focus more on the creative choices that really matter to me. That balance between freedom and support makes learning a lot more enjoyable and productive.

This comment highlights AI’s efficiency as a significant advantage, enabling people to move quickly through routine tasks and focus more on making meaningful, creative decisions. For Participant 5, the combination of flexibility and structured help created a more interesting and productive learning environment. Participants 6, 7, and 8 expressed similar thoughts, with each noting speed as a key benefit of AI capabilities. Participant 6 emphasised both speed and customisation. Participant 7 focused solely on speed, while

Participant 8 stated that speed aided in learning and comprehending concepts. This cluster of responses indicates a clear consensus that AI technologies considerably improve the learning experience by delivering on-demand results and adapting to individual learning preferences.

Participants 9–14 reinforced key themes indicated by Participants 1-8, including the simplicity of use, customisation, and speed of AI tools.

Participant 9 selected simplicity of use and personalisation as significant features of AI tools, which is consistent with previous replies that emphasised the adaptability of such technologies to individual user demands. Participant 10 echoed the importance of simplicity of use, pointing out that it allowed for deeper engagement with critical public health themes by making it easier to discover and grasp essential terms. Despite AI's complex underlying models, Sedaghat (2023) asserted that a key AI component of its appeal is its simplicity of use. Participants 11 and 12 gave examples of popular AI applications, such as ChatGPT, Grammarly, QuillBot, and Humanizer, emphasising their user-friendly interfaces and capabilities. Some researchers have also noted that students use writing tools with AI, such as Grammarly, QuillBot, and Wordtune, to assist them with paraphrasing in their academic work (e.g. Raheem et al., 2023), as discussed in Chapter 3, Section 3.2.6.

Participant 11 praised the speed and simplicity of AI tools, while Participant 12 added how they enable users to ask questions organically and modify content swiftly. Participant 13 focused on speed but offered a more multifaceted view regarding accuracy, stating that while AI tools are fast, their accuracy is not always reliable. This cautionary remark provided a critical perspective, indicating AI's limitations in specific settings. These limitations of AI were also mentioned by Mitelut *et al.* (2023) in Chapter 3, Section 3.2.10, where they stated that users should be aware of the limitations of AI. Furthermore, Mitelut *et al.* (2023) emphasised the concern expressed by Participant 13, pointing out that AI

can occasionally provide answers that seem plausible but are factually incorrect or lack adequate contextual awareness (Chapter 3, Section 3.2.10).

Meanwhile, Participant 14 applauded AI for its speed and ease of use, citing how it significantly decreased the time required to sift through various academic sources to identify relevant references. The participant further mentioned its efficacy in correcting coding errors during data analysis, demonstrating its usefulness beyond writing and reading tasks and receiving immediate responses, thereby increasing overall productivity and comprehension.

Participant 16 stated that AI reduced the time spent reading through 10 papers for one reference. It also assists in correcting coding errors in data analysis, highlighting that AI has considerably improved her learning experience through speed and ease of use. However, Participant 16 was also cautious: “speed yes, as for accuracy, not all the time”. This is comparable to Participant 13’s statement that AI doesn’t always provide accurate answers. This offers a tempered view of AI’s role. While it is useful for time savings, its outputs must be verified, and human oversight is crucial. The participant understands that AI may provide generalised or imprecise information, needing critical examination and human control.

Participants’ responses underpin the TAM theory by emphasising the speed and real-time responsiveness of AI capabilities. These characteristics enhanced the perceived usefulness of the tools by enabling students to receive rapid answers and feedback, ultimately leading to higher learning satisfaction.

5.3.1.2 Theme 2: The Most Common AI Tools

The second theme focussed on recognising the AI tools available to students in educational environments. Participants were asked, “Which AI tools are the most

accessible and beneficial in your studies on learning platforms?" Responding to the question, Participant 1 stated that Mindgrasp, Copilot, and Anara, were used, showing a wide range of specialised AI technologies. A follow-up interview with Participant 1 was conducted to get a better understanding of why Mindgrasp, Copilot, and Anara were the most commonly used AI tools in his studies. He indicated that they were largely web-based or incorporated into widely used software platforms, making them conveniently accessible from many devices. Their user-friendly design also required no technical knowledge, allowing for quick use and accommodating both self-paced and flexible learning contexts. This implies a nuanced engagement with AI, influenced by context, confidence, and institutional guidance. The participant added that Mindgrasp was frequently used to summarise lengthy texts or extract important ideas from papers and lectures, which had improved his comprehension of the material and saved him time.

Participant 1 went on to say that he found Copilot's integration with Microsoft Office tools very helpful for developing academic material authoring, editing, and formatting skills, which are crucial for creating assignments, reports, and presentations. Anara also assisted him with important academic tasks, including managing citations, doing literature reviews, and locating pertinent academic sources, all of which are essential elements of HE research. These platforms recommend utilising tools that facilitate learning through summarisation (Mindgrasp), code creation or automation (Copilot), and possibly content augmentation (Anara) (Haeggström, 2024). This participant preferred personalised and adaptable AI features. Participant 2 mentioned libraries and journal articles instead of AI-powered platforms, which could indicate a preference for traditional academic resources. This indicates that, despite being aware of AI, this participant relied on traditional academic resources and methods, or utilised AI tools as a supplement to formal research databases. Participant 3 cited ChatGPT and QuillBot. These tools are commonly used for content generation and paraphrasing, highlighting a focus on writing assistance, grammar refinement, and content rephrasing for academic tasks. Khalifa and Albadawy (2024) also reiterated this (as discussed in Chapter 3, Section 3.2.12), stating that AI tools such as

grammar checkers and citation generators helped students to produce work of a higher calibre. Accordingly, this strengthens the case that utilising AI to improve grammar was beneficial for students. Examples of such technologies include grammar checks. Participant 4 stated that he used ChatGPT exclusively. This suggests a dependence on a single, general-purpose AI tool capable of various academic tasks, such as answering questions, summarising readings, and assisting with writing.

Participant 5 reported utilising both Caktus AI and ChatGPT, implying a combination of technologies with similar but unique features. Caktus AI is commonly utilised for rapid task execution and summarisation, while ChatGPT provides a conversational interface for in-depth academic support (Koubaa *et al.*, 2023). Participant 6 mentioned ChatGPT, Copilot, and Perplexity. This combination indicates the use of AI for various academic tasks, including ChatGPT for general academic support, Copilot for programming or automation, and Perplexity for AI-enhanced web search. Participant 7 also mentioned ChatGPT and Copilot, like Participant 6. This indicates that these tools are being utilised to assist with both writing tasks and technical features, such as coding or structured academic outputs. Participant 8 reported utilising ChatGPT, indicating a more efficient strategy in which a single, versatile tool is used for various academic purposes.

Participant 9 mentioned employing AI to map research literature across several institutions, research groups, and authors. This implies the use of AI technologies to structure and visualise academic research landscapes, although no specific tools were mentioned. The emphasis here is on AI's organisational and analytical capabilities in synthesising massive amounts of academic knowledge. Participant 10 utilised ChatGPT for writing assistance and concept clarification, Grammarly for refining academic language, and Zotero, which features AI enhancements, for reference management. Alshammari *et al.* (2024) highlighted that PyZoBot is a Python-based AI platform that effectively extracts and synthesises data from sizable, carefully maintained collections of scientific literature by fusing OpenAI's language models with Zotero's reference

management. This illustrates a comprehensive academic workflow powered by AI, from idea generation to citation organisation. Participant 11 listed ChatGPT, Grammarly, QuillBot, and Humanizer. This combination of AI tools demonstrates reliance on several writing and editing tools for drafting, paraphrasing, grammatical correction, and possibly content structuring (Humanizer may be used to humanise AI-generated material). Participant 12 reported utilising open-source technologies, notably ChatGPT, DeepSeek, and QuillBot. This highlights the need for both mainstream and alternative AI tools, presumably driven by accessibility and capabilities beyond writing aid, such as information retrieval or summarisation. Mainstream AI tools are well-known, extensively utilised systems from reputable businesses, like IBM Watson, Microsoft Copilot, Google Gemini, and ChatGPT (Johnsen, 2025). Johnsen (2025) further argued that these mainstream AI tools are prized for their scalability, dependability, and ability to be integrated into academic and professional workflows.

Conversely, less well-known, up-and-coming, or specialised AI tools frequently comprise open-source, experimental, or purpose-specific platforms (Martini, 2024). Examples include open-source language models such as LLaMA, Mistral, and HuggingFace models, as well as Zotero-integrated plugins like PyZoBot and KNIMEZoBot, and research-oriented programmes like Perplexity AI, Research Rabbit, and Elicit (Alshammari *et al.*, 2023). These technologies supplement popular AI platforms by offering unique and specialised solutions (Alshammari *et al*. 2023). Participant 13 used AI to support disease research but did not name any specific technologies. This suggests that AI can be employed for content-based tasks such as retrieving and exploring health-related information. Participant 14 indicated ChatGPT, Consensus, and Research Rabbit. These technologies were utilised for literature synthesis (Consensus), research discovery and mapping (Research Rabbit), and general academic assistance (ChatGPT), indicating a trend towards more research-intensive AI tools. Participants 15 and 16 mentioned ChatGPT, Grammarly, QuillBot, and Humanizer as the most accessible AI tools,

indicating a strong preference for language-enhancing services that facilitate writing, paraphrasing, and academic communication.

From the above, it became clear that ChatGPT was the most commonly mentioned AI tool utilised by 10 of the 16 participants (Participants 3–8, 10, 11, 12, 14, 15, and 16), suggesting its widespread appeal and perceived effectiveness in a variety of academic tasks. Singh (2023) maintained in Chapter 3, Section 3.2.5 that OpenAI's ChatGPT, for example, is a popular generative AI platform that aids in complex inquiries, content production, and interactive discussions. Singh (2023)'s claim is supported by the participants' comments, which revealed that ChatGPT was the most often utilised AI tool in education. Participants 1, 6, and 7 all cited Copilot, indicating its expanding use in assisting with tasks like content drafting and coding. One participant highlighted QuillBot, Caktus AI, and Perplexity, demonstrating a deliberate and selective use according to specific academic needs. There appeared to be an increasing interest in AI tools that help with literature reviews and academic discovery, as evidenced by the attention of Participants 9 and 14 on tools like Zotero, Consensus, and Research Rabbit that facilitate literature mapping and research visualisation.

Participants' responses to these technologies are supported by connectivism, which enables learning to take place through networks, of which AI is one node. In Chapter 2, Section 2.2.1.2, the theory's founders, Downes and Siemens (2014), made a similar argument to connectivism, which maintained that knowledge is distributed throughout networks and that learning involves building, navigating, and connecting these networks, with technology acting as a crucial tool to enable this. This theory provides a framework for assessing how students navigate and integrate knowledge from numerous AI sources, which is why participants in this theme's study also touched on digital literacy or the range of platforms (ChatGPT, Perplexity, libraries, etc.). Students who possess digital literacy are able to recognise trustworthy nodes (sources) in the network, recognise high-quality

content, and build connections that turn scattered information into knowledge that can be utilised (Jansen, 2023).

5.3.1.2a Sub-theme 1: Student perceptions and satisfaction with common AI tools in the digital age

As part of the broader theme on commonly used AI tools in education, participants were asked to reflect on their level of satisfaction with incorporating AI in the digital era. The purpose of this question was to gain insight into whether the AI tools previously mentioned, such as ChatGPT, QuillBot, and others, had effectively met their academic needs and expectations. Out of the 16 participants, 15 provided responses. The one non-response did not impact the overall analysis, as the responses received were comprehensive and offered valuable insights into user satisfaction, as captured below.

It was evident that Participants 1, 2, 3, 4, 6, 9, and 10 were satisfied. Participant 1 characterised her encounter as “very satisfied”, for example. AI use was described as “just amazing” by Participant 3 and “extremely satisfied” by Participant 4. Participant 6 demonstrated advocacy beyond self-gratification by stressing the significance of institutional acceptance of AI. Participants 5 and 11 provided insightful viewpoints. According to Participant 5, AI is a “key creative partner” intended to support and foster human creativity, rather than replace it. While highlighting satisfaction, Participant 11 emphasised the importance of critical understanding to prevent compromising professional progress and critical thinking. While acknowledging AI’s usefulness, Participant 7 questioned its dependability in comparison to more conventional sources such as literature. Participant 8 expressed concerns about the false information generated by AI. In a follow-up interview, Participant 8 referred to incorrect information generated by AI tools, specifically the tendency of such tools to produce citations that appear valid but are, in reality, falsified. The participant emphasised the importance of verifying information before utilising it in academic writing. Participant 8’s opinion was also

supported by Walters and Wilder (2023), who pointed out a particular kind of hallucination in which AI models produce references to academic publications that do not exist, indicating that a sizable percentage of the cited works were fake. To ensure the authenticity and dependability of information used for educational purposes, the participant also suggested fact-checking AI-generated content utilising reputable academic sites such as ResearchGate and Google Scholar.

Participant 12 said that AI utilisation was mediocre and emphasised the value of reading books to gain a foundational understanding before depending on AI. In a similar vein, Participant 13 acknowledged the value of AI but cautioned that fact-checking remains necessary due to sporadic errors. Participants 15 and 16 expressed moderate satisfaction with AI, noting its usefulness when combined with traditional learning. Participant 15 further emphasised the need to first gain knowledge through books before utilising AI to consolidate ideas, while Participant 16 highlighted the importance of utilising AI responsibly to avoid undermining critical thinking and long-term career development.

Consequently, participants' attitudes towards the use of AI in educational settings were overwhelmingly positive, acknowledging advantages including convenience, support for creativity, and institutional growth. The dependability of AI and the danger of over-reliance, however, were also questioned by several participants, who emphasised the ongoing significance of critical thinking, fact-checking, and the fundamental information provided in conventional academic sources. This careful and enthusiastic approach to the changing role of AI in education shows maturity and balance.

An overview of the participants' responses to the theme of how satisfied they were with the usage of AI technologies in the digital age can be found in the pie chart below. It shows differing levels of satisfaction. The idea that students commonly view AI tools as helpful is supported by the prevalence of high and moderate satisfaction ratings. The modest percentage of low satisfaction and non-responses, however, emphasises how

crucial it is to consider a range of experiences and make sure AI adoption strategies are inclusive. One participant indicated low satisfaction, four had mixed feelings, eight were very satisfied, and one did not respond to the question.

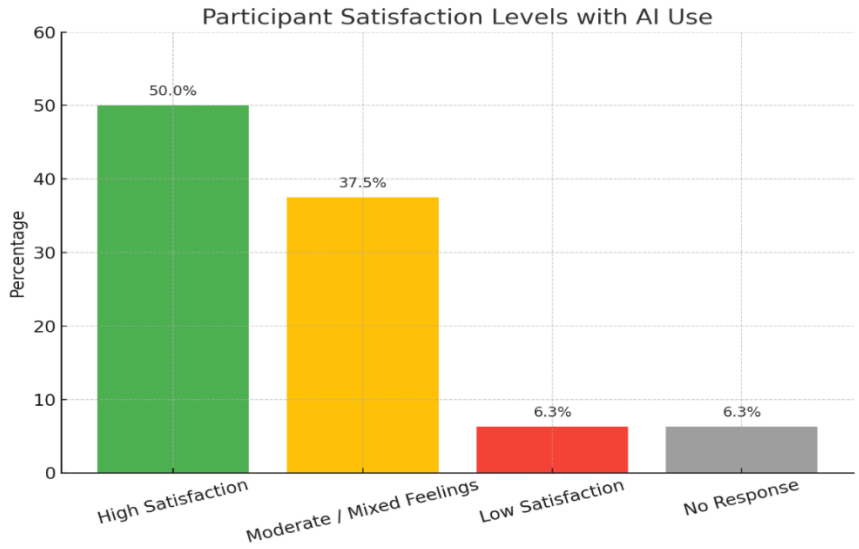

Figure 5.3.1.1: Participant Satisfaction Levels with AI Use (Source: Author's design; percentage calculations assisted by ChatGPT)

5.3.1.3 Theme 3: Perceived Advantages of Utilising AI

In this third theme of the study, participants were asked "In your opinion, what role will AI play in your future career in public health or education?" The responses received also contributed to addressing Research Question 1, which focused on participants' perceptions of the benefits and disadvantages of incorporating AI into public health studies. Two sub-themes emerged within this theme. The first subtheme, "AI in the Classroom", under perceived advantages of utilising AI, investigated the importance of AI in education by analysing how new technologies affect teaching, learning, and educational institutions. The focus of the second theme, "Improvements in AI Use in Education", deals with the improvements in the integration of AI. The second sub-theme

identifies the sensitive, successful, and ethical applications of AI tools, ensuring they promote student development rather than hinder it. The first sub-theme will be discussed following an analysis of the perceived advantages of utilising AI. Participants offered a range of insightful perspectives on the projected impact of AI on their future careers in public health and education. Several responses emerged, including AI's ability to simplify tasks, enhance learning, facilitate data analysis, and improve professional communication. Participants 1 and 2 indicated the efficiency that AI provides.

Participant 1 described AI as playing a "huge role", whereas Participant 2 emphasised that AI considerably simplifies life by enabling tasks that previously took years to be completed in much less time. Participants 3 and 4 shared similar perspectives, emphasising that AI enables knowledge expansion without the necessity for formal enrollment in traditional academic institutions. This demonstrates AI's ability to democratise access to learning. Participants 5 and 9 mentioned additional technical applications, such as model execution and data cleaning/analysis, emphasising AI's role in increasing efficiency when dealing with complicated datasets. Participant 6 had a balanced viewpoint, viewing AI as a helpful tool that improves tailored learning and data analysis, while emphasising the ongoing significance of human participation in education and public health.

Participant 7 agreed, noting that AI improves learning when utilised appropriately. Participants 8 and 14 discussed how AI enhances productivity, with one claiming greater speed and the other emphasising its usefulness for report writing, paper summaries, and literature searches. Participant 10 described AI as an "integral part" of their future career while Participant 11 provided a more detailed response, stating that AI would improve data-driven decision-making, improve health surveillance, support evidence-based policy development, and personalise learning and healthcare interventions. Participant 12 appreciated AI's assistance with writing activities, including emails, letters, and research-related work. Participant 13 anticipated AI taking an important role, particularly in

complicated, real-world data analysis. Both Participants 15 and 16 saw AI as a useful educational tool. Participant 15 emphasised how AI can personalise learning and simplify complex data in public health and education, but emphasised that it should complement human interaction rather than replace it. Participant 16 also recognised that AI improves learning when used appropriately, highlighting the significance of careful integration. Participant 16's response is related to Srinivasa et al. (2022)'s argument in Chapter 3, Section 3.2.9, which states that AI enhances lecture delivery, automates tests, and facilitates easier online communication between students and teachers.

The findings indicate that participants viewed AI as a powerful and versatile tool that will play a significant role in their future employment. AI is regarded as a beneficial resource, whether used to improve learning, ease administrative or research duties, or enhance data-driven decision-making, if it complements rather than replaces human intuition. These findings contribute to the overall subject of AI's favourable impact on academic and professional growth in public health and education. Follow-up interview questions were deemed unnecessary for this theme as the responses obtained through the online questionnaire provided sufficient depth and clarity.

The TAM underpins this theme. As mentioned in Chapter 2, Section 2.2.1, the TAM offers a theoretical framework for examining perceived advantages of utilising AI. By integrating PU, PEOU, and AU into participants' experiences, the TAM facilitates the interpretation of data in a systematic and academically robust manner. The TAM is used in this study to investigate perceived usefulness, capturing how people judge the benefits of AI in practice. Next, the first sub-theme is discussed.

5.3.1.3a Sub-theme 1: AI in the classroom

The question "What additional rewards/benefits have you experienced from utilising AI during your studies?" in the questionnaire gave rise to this sub-theme on AI in education.

According to the participants' responses, there are a variety of perceived benefits of integrating AI in their studies. These responses are comparable to the arguments made by Xulu *et al.* (2024) in Chapter 3, Section 3.2.12, who contend that AI offers several benefits, including enhanced writing skills, improved access to information, and increased levels of engagement in educational activities. Time productivity and efficiency are key elements that emerged from the analysis. Several participants specifically mentioned how AI had enhanced their ability to manage their academic workload. As indicated by Participant 1, "Time used to rewrite notes has been reduced", and similarly by Participant 4, "Time to solve some problems was reduced". According to Participant 6, "AI really helped me manage my time better. I could organise projects more easily", and the participant compared it to "having a never-tired assistant". The participants' statement that AI had helped them to write notes faster is consistent with the literature, as noted by Atlas (2023), which argues that AI reduces administrative work and provides students with 24/7 support, quicker response times, and real-time help (Chapter 3, Section 3.2.6). ChatGPT, Scholarcy, and SMMRY are examples of AI summarising technologies that can condense long articles or lecture transcripts into manageable notes (Alobaedi, 2025).

Participant 2 was grateful for the structured assistance that AI offered, saying, "As a student who is constantly busy, I am able to do my stuff in a simpler way by its guidance and time management schedules I asked it to create for me, which helps me a lot." It is "so time saving", as Participant 7 put it, and "[I]t has significantly improved my time management by helping me complete tasks faster, such as summarising articles, generating study guides, and organising my ideas," as Participant 12 expressed. In a succinct yet straightforward comment, Participant 16 reaffirmed this response, saying "Time saving". Another notable effect is improved learning and comprehension. AI appears to be helping students gain a better understanding of academic subjects by providing detailed explanations and contextual knowledge. Participant 3 stated that "My responses are often broadened. AI also provides background information," and

Participant 5 responded that “It has just made studying easier and more understanding.” (sic).

According to Participant 10, AI delivers “comprehensive explanations of topics, making them more approachable content”, while Participant 14 stated that “AI assists with polishing grammar or understanding technical jargon. It also enhances the organisation of my academic writing and assists me in learning complex material.” This is related to the issue of academic writing and language abilities. Several participants mentioned that AI had helped them to improve their language, sentence structure, and clarity. Participant 8 reported “improving the usage of grammar”, while Participant 12 highlighted how AI “boosted my confidence in academic writing and research by providing real-time feedback and suggestions”. Participant 14 added that AI “improves the structure of my academic writing” and helps them to “understand technical terms”. Many participants reported feeling cognitively and creatively empowered after utilising AI. Participant 6 reported, “It gave me the confidence to explore new creative angles,” while Participant 12 stated that AI assisted with “organising my ideas” and provided a sense of control over academic assignments. Participant 13 simply stated, “It has made life easy for me,” expressing the belief that AI simplifies and improves learning processes. In a follow-up interview, Participant 13 emphasised how AI technologies helped with grammatical checks, paraphrasing, and academic writing structure, which greatly decreased stress during assignment preparation. The participant also mentioned that AI was always available, unlike human tutors, allowing for more autonomy in handling academic assignments and flexible, self-paced learning. Interestingly, some responses underlined the emotional and social support that participants received from interacting with AI. Participant 9 argued, “Studying can be isolating. I feel like I have a clever friend to chat to,” presenting AI as a helpful presence rather than a functional tool. Similarly, Participant 6’s depiction of AI as an “assistant who never gets tired” implies a sense of friendship during the learning process. In their study on whether AI companions could alleviate loneliness, De Freitas *et al.* (2025) found that AI companions can reduce loneliness to an extent equivalent to

connecting with a human. This implies that AI can offer friendship and emotional support, as suggested by Participant 6 and De Freitas *et al.* (2025).

There was also an acknowledgement of AI's function in providing academic advice and organisation. Participant 2 indicated that AI gave "guidance and time management schedules", while Participant 15 stated that it "gave a clue about the assignment", meaning that AI aided in clarifying academic work. Participant 12 cited AI's assistance in "summarising articles, generating study guides, and organising my ideas", demonstrating that AI helped with planning and direction in their studies. Some participants emphasised larger cognitive or intellectual benefits beyond immediate academic objectives. Participant 11 referred to "worldview expansion" while Participant 12 elaborated by stating, "Using AI during my studies has brought several additional benefits beyond academic support," implying that AI use may also facilitate personal development and broader thinking skills.

Table 5.3 below provides a summary of the responses participants gave to the sub-theme of AI in the classroom.

Table 5.3: Summary of Sub-theme 1 - AI in the Classroom

Topic	**Participant Numbers**	**Example Quotes**
Time Efficiency and Productivity	1, 2, 4, 6, 7, 12, 16	"Time used to rewrite notes has been reduced" (P1), "Time saving" (P16)
Enhanced Learning and Comprehension	3, 5, 10, 14	"Well detailed explanations of concepts" (P10), "Studying better and understandable" (P5)
Academic Writing and Language	8, 12, 14	"Improving the usage of grammar" (P8), "Refining grammar" (P14)

Cognitive and Creative Empowerment	6, 12, 13, 14	“Explore new creative angles” (P6), “Made life easy for me” (P13)
Emotional Support and Companionship	6, 9	“A smart friend I can talk to“ (P9), “Assistant who never gets tired“ (P6)
Guidance and Academic Structure	2, 12, 15	“Guidance and time management schedules” (P2), “Given clue about the assignment” (P15)
Worldview and Intellectual Progress	11, 12	“Worldview expansion” (P11), “Benefits beyond academic support” (P12)

5.3.1.3b Sub-theme 2: Improving AI’s application in education

Improving the use of AI in education is the second sub-theme of the perceived benefits of AI. AI has significant potential for use in education, but its implementation must be continuously improved to reach its full potential (Yadav, 2025). Better academic results, more individualised student support, and more effective teaching techniques can result from optimising AI’s application in learning environments (Xu, 2024). Consequently, several important insights regarding the ethical and successful integration of AI in educational settings can be gleaned from the participants’ responses. According to the findings, students see AI as a tool for learning that should be used critically, morally, and purposefully rather than as a substitute for critical thinking.

The significance of actively and critically utilising AI tools is one of the main responses in this theme. Participants underlined that students should comprehend AI’s significance in enhancing their education rather than depending solely on it. Participant 3 suggested, for example, that “They must use credible sites and use them in addition to their materials and avoid letting AI do everything for them.” Participant 5 further said, “Use it for understanding.” Participant 10 cautioned that “AI is not the answer to self-education, it is a guide.” Others advised against copying and pasting. These opinions are in line with a common worry that, if used carelessly or passively, AI may impede rather than promote

intellectual development. In favour of these viewpoints, Baron (2023) argued that students may become unduly dependent on AI for writing assignments, which could reduce their chances of developing their own critical thinking and problem-solving skills. The notion that AI should be viewed as a study tool rather than a shortcut is related to this. While Participant 14 reaffirmed that AI should be used “as a learning companion, not a replacement for their own thinking,” and Participant 6 pointed out that students should “Use AI like a study partner, not a crutch… it still needs your voice. Therefore, students should continue to be responsible for their academic work and utilise AI to supplement their creativity and critical thinking rather than to replace it.

The demand for the ethical and responsible application of AI is another aspect that was mentioned. Participant 2 said, “Make the most of AI, not misuse it. It is our responsibility to use it for its intended purpose.” In a similar vein, Participant 12 suggested “attending university workshops or online tutorials to learn about ethical AI use” and stressed the importance of checking answers, posing pertinent questions, and fostering digital literacy. Participant 12 further stated that attending workshops will help users stay current with new tools, features, and best practices, the participant stressed, as AI is always changing. Additionally, the participant emphasised that these workshops will frequently address fundamental ethical issues, such as preventing plagiarism, protecting data privacy, and encouraging the responsible application of generative AI. This demonstrates a desire for an accountable culture and moral AI tool use. The value of independent thought and conducting one’s own research was also emphasised.

AI “must be a secondary source of information” according to Participant 8 while Participant 9 advised “consulting it after doing your own work” and Participant 7 recommended “always reading and understanding the concept”. “Do your research on the available AI tools and use them to your advantage, but never forget to critically examine the AI outcome,” said Participant 16. By doing this, students will be able to understand its true impact, guarantee fair access, enhance their learning methods, and

contribute to the development of ethical integration policies. The research of Owoc *et al.* (2019) supports what Participant 16 said, stating that students can assess AI outcomes and investigate its application or influence before putting it into practice to determine whether AI technologies improve learning, engagement, and academic success.

A response of practicality and problem-solving also surfaced, along with recommendations for particular resources and methods for students. While Participant 12 advised looking into apps like “ChatGPT for writing and research, Grammarly for writing improvement, and Zotero or Mendeley for reference management”, Participant 11 proposed employing AI to “create flashcards and podcasts of the study material”. Participant 11 further suggested that students “play with different tools and use the ones that are most effective”. This implies that to fully realise AI’s learning potential, experimentation and customisation are crucial.

Some of the participants’ responses in this theme showed similarities. For example, Participants 3, 5, 6, 10, and 14 all stated that AI should enhance learning rather than replace it. Additionally, participants 3, 7, 12, 14, and 16 said that when employing AI, students need to maintain their critical and analytical thinking. AI should be used responsibly and ethically, according to Participants 2, 12, and 14. Participants 8, 9, and 16 made the case that independent thought and investigation must come first. Participants 1, 6, and 12 recommended that students try out and investigate various tools. Participants 11 and 12 reported that useful applications such as creating study aids were brought up. Participants 12 and 14 stated that ethical awareness and digital literacy are crucial. The table below summarises the findings of this sub-theme.

Table 5.4: Summary of Sub-theme 2 - Improving AI’s Application in Education

Topic	Participant Numbers	Representative Quotes

AI as a Study Aid, Not a Replacement	3, 5, 6, 10, 14	“Use AI like a study partner, not a crutch.” (P6)
Critical Thinking and Analysis	3, 7, 12, 14, 16	“Critically analyse AI outcomes” (P16)
Ethical and Responsible Use	2, 12, 14	“Use AI for the best use of it, not in a bad way.” (P2)
Prioritise Independent Work	8, 9, 16	“Consult it after doing your own work.” (P9)
Explore and Customise AI Tools	1, 6, 12	“Play with different tools.” (P1)
Practical Use (Study Aids and Tools)	11, 12	“Use it to help you study by creating flashcards.” (P11)
Build Digital Literacy	12, 14	“Attend workshops or tutorials.” (P12)

5.3.1.4 Theme 4: AI Adoption Challenges

The fourth theme focuses on the problems students indicated when incorporating AI into their studies, which corresponds to one of the study’s research sub questions. As discussed below, most participants cited information inaccuracy as a major worry, pointing out that AI tools can occasionally give wrong or misleading content.

Participants 2, 3, and 4 reported no problems. These responses show that some users found AI products to be accessible and useful without experiencing significant difficulties. Participant 1 pointed out that most tools have subscription costs, which limits access for those who cannot afford premium versions. Participant 1 further voiced concerns in the follow-up interview over the high subscription charges of AI tools, stating that they prevented him from utilising them as much as he would have liked. He explicitly stated that when he tried to use ZeroChatGPT, he was unable to download a document that was more than 15,000 words without first paying for a subscription. He mentioned that he was

pursuing a PhD in public health, a field that requires extensive study, and has presented a significant challenge for him. Consequently, he was unable to efficiently use AI tools to help with his academic work due to cost-related limitations. Participant 11 confirmed that some apps request payment before use. These responses indicate concerns about financial constraints, which may impede equitable access to AI resources.

Participant 5 expressed initial dissatisfaction with phrasing prompts to elicit useful responses, noting that AI occasionally overlooked innovative nuances. Participant 13 stated that inaccurate output typically depends on how queries are phrased, demonstrating a reliance on user prompting ability. In a similar response to Participant 5, Kulkarni and Tupsakhare (2024) contended that specific and well-structured prompts can assist the AI in producing more accurate and relevant responses. This emphasises how crucial it is to communicate precisely and clearly when working with AI systems. This shows that AI literacy training is necessary to maximise the effectiveness of AI tools. Participant 6 indicated that AI can deliver information that is out of context or irrelevant, while Participants 7 and 8 referred to erroneous results. Participant 9 warned about errors and forged citations from web sources. Participant 10 expressed concerns about obsolete or generic content, a lack of contextual sensitivity, and a failure to consider cultural nuances in public health. Participant 12 voiced concerns about AI's lack of depth and erratic referencing, implying that it occasionally fails to meet academic norms. Similarly, Participant 14 criticised AI for generating paradoxes, making mistakes, and having trouble with intricate activities like coding. Mitelut *et al.* (2023), in Chapter 3, Section 3.2.10, confirmed what Participants 12 and 14 and pointed out that AI may sometimes give answers that seem reasonable but are factually incorrect or lack context awareness.

Participant 15 provided a more precise account of their initial displeasure with AI, pointing out that it takes time to figure out how to formulate inquiries in a way that yields insightful answers. Additionally, Participant 15 noted that AI responses either lacked the necessary creative complexity or were overly generic. This indicates that utilising AI tools has a

learning curve and that, although useful, the technology might not be able to produce context-sensitive or innovative results without fine-tuning input. In a similar vein, Participant 16 cautioned that “One has to check for accuracy.” This demonstrates an understanding of the reliability constraints and supports the notion that, especially in academic settings, AI-generated content needs to be critically assessed and verified before being used. These responses highlight widespread concerns about the contextual accuracy of AI-generated academic writing. However, Participant 15’s comments contradicts Bordag’s (2007) claim in Chapter 2, Section 2.2.2.1 that connectivism principles are necessary for utilising AI technology to deliver timely and pertinent learning feedback. Participant 15 expressed dissatisfaction with AI taking time to figure out how to formulate questions. To investigate this seeming contradiction, a follow-up interview with Participant 15 was undertaken. The participant clarified that when he was uncertain about how to properly phrase his queries, AI frequently took a long time to respond. This contrasted with the literature, which contends that, in the best circumstances, AI responds promptly. By revealing contextual elements that affect response times in real-world usage, such as user familiarity, question phrasing, and system limits, the follow-up helped to illustrate how real-world experiences can deviate from theoretical assumptions.

The summary of the responses that led to Theme 4, as shown in the table below, found that information inaccuracy was the most often cited concern among participants. Several participants stated that AI-generated content frequently lacked precision, provided misleading or outdated information, or produced ambiguous and generalised answers. In several cases, participants mentioned overlapping issues, such as encountering both erroneous content and fake or poor citation techniques, especially when referencing academic sources. Interestingly, only a tiny proportion of individuals reported no difficulties, implying that fully problem-free encounters with AI technologies were uncommon. Overall, the findings highlight a clear need for increased digital literacy among users, with a focus on improving skills in fast engineering and the ability to critically examine and fact-check AI-generated outputs.

Table 5.5: Summary: Theme 4 AI Adoption Challenges

Challenge Category	Description	Participants Affected	Frequency
1. No Challenges	Participants experienced no significant issues when utilising AI.	Participants 2, 3, 4	3
2. Access and Cost Limitations	Tools required subscriptions or payments, limiting accessibility	Participants 1, 11	2
3. Prompting and Usability Issues	Difficulty in phrasing prompts to receive useful responses; frustration with general outputs	Participants 5, 13	2
4. Inaccuracy of Information	AI provided incorrect, vague, or misleading content	Participants 6, 7, 8, 9, 10, 12, 13, 14, 15 and 16	10
5. Fabricated or Poor Citations	Errors in references and misinformation about sources	Participants 9, 12	2
6. Outdated or Shallow Content	Responses lacked depth, context relevance, or up-to-date information	Participants 10, 12	2
7. Lack of Cultural / Contextual Fit	AI failed to grasp localised public health nuances and complex societal issues	Participant 10	1
8. Technical Limitations	Struggled with tasks like coding; AI gave inconsistent or contradictory results	Participant 14	1

Some participants found AI useful for simplifying work and increasing efficiency. Others' perceived usefulness was reduced as a result of mistakes, generalisations, or irrelevant outputs. Moreover, although only three participants reported that they did not encounter any challenges and found AI helpful in streamlining their academic work, the majority raised concerns about its reliability. In particular, 10 out of 16 participants expressed concerns about the inaccuracy of AI-generated content. These concerns highlight the need for academic verification of AI-assisted outputs through credible scholarly sources such as Google Scholar, ResearchGate, Scopus, Web of Science, ScienceDirect, IEEE Xplore, SpringerLink, Taylor & Francis, SAGE Journals, JSTOR, university library databases, and trusted institutional or government publications (Razack *et al.*, 2021). The participants' concerns directly influence their perception of AI's ability to enhance performance, which is a central construct in the TAM.

5.3.1.5 Theme 5: Concerns About Academic Integrity and Ethics

This theme enabled the researcher to compare the ethical usage and ascertain whether participants recognised the ethical implications of utilising AI and how to address them without compromising educational quality. Participants responded to the question in the questionnaire, "What is your opinion on the ethical concerns of utilising AI?" No sub-theme emerged from this theme.

The responses gathered from the 16 participants provided valuable insights into their perceptions of the ethical implications of utilising AI, particularly in educational settings. Several participants expressed concerns about data privacy and the protection of user information. Participant 1 stated that her biggest concern about the ethical usage of AI was "privacy and protection of user data". Participant 12 elaborated on this concern, highlighting the importance of data privacy, informed consent, and the potential for algorithmic bias, stating, "I believe the ethical implications of using AI are significant and must be carefully considered, particularly in fields like public health and education."

Critical issues mentioned include data privacy, algorithmic bias, and informed consent. Another common response was the fear that AI would be exploited or utilised improperly. In this regard, Participant 2 emphasised that "…access will be revoked if you are found using it for the wrong things". A semi-structured follow-up interview with Participant 2 revealed that her comment implied that the deployment of AI is contingent on upholding academic integrity. Participant 2 went on to say that the term "wrong things" in her response refers to practices such as plagiarism, assignment fraud, and exploiting AI to circumvent learning. Therefore, institutions of HE may need to establish rules and guidelines on the use of AI to maintain equity and moral behaviour in instruction. Limiting or directing the use of AI technologies is a precaution to guarantee they are used responsibly and constructively, even though universities cannot directly restrict access to these freely available platforms (Linna & Muchman, 2020).

Similarly, Participant 10 expressed concern about the possibility of AI-generated content being used to mislead or manipulate public opinion, saying, "Misinformation and manipulation: AI-generated content can be used to mislead or manipulate public opinion, which calls for strong ethical frameworks and safeguards." Participant 11 noted that "it needs to be rigorously monitored and regulated," emphasising the importance of oversight. Participant 14 echoed this sentiment, adding unequivocally, "As AI evolves, there should be stronger policies and educational efforts to ensure its ethical use and security measures, particularly in sensitive areas like education." In a subsequent interview, Participant 14 emphasised the importance of educational institutions addressing the moral dilemmas raised by utilising AI. He emphasised the significance of creating and implementing precise compliance procedures as well as thorough rules or policies for students. The participant argued that students would struggle to use AI technologies in an ethical and effective manner if there were no clear policy in place to guide them on their use. He emphasised the need for educational institutions to go beyond simple warnings and instead provide thorough, practical guidance that helps students understand the potential benefits and drawbacks of AI technology.

The issue of overdependence on AI was also prevalent in the findings. Participants 3, 6, 8, and 9 all agreed that AI should be utilised to augment, not replace, human talents. Participant 3 stated, “AI is intended to augment your materials, not perform the thinking for you.” Institutions should implement stricter measures to detect AI. Participant 6 added:

> I believe employing AI comes with a lot of responsibility. It’s tempting to rely on it too heavily, therefore I aim to keep my work original. I believe it is critical to employ AI as a support rather than a shortcut that detracts from personal work or originality.

Participant 8 indicated unequivocally that “reasoning capacity will be limited and solely rely on AI for the information that one would easily obtain”, while Participant 9 stated that “it cannot be used to replace human effort.” These responses highlight a common concern about the potential decline of human agency, critical thinking, and creativity in the face of increasing reliance on AI. Several participants stated that if AI is not used properly, it can enable plagiarism or academic dishonesty. Participant 16 raised this matter, stating, “Depending on the use, it can plagiarise work done by others if used as is.” Participants 3 and 6, who had previously commented on dependency, emphasised the importance of creativity and highlighted that AI should not be used as a shortcut, thereby confirming the ethical issues in educational contexts. In addition to the necessity for responsible use, numerous participants emphasised the importance of regulation and ethical norms. Participant 13 underlined that “it’s very important to comply with ethical standards”, while Participant 12 remarked that “AI systems can unintentionally reinforce inequalities if not properly designed or monitored.” These viewpoints represent a belief that ethical norms and regulatory enforcement are required to ensure fair and responsible AI development and application. Some participants questioned the dependability and usefulness of AI. For example, Participant 15 commented that it is “less reliable when compared to books”, indicating a preference for traditional information sources over AI-generated content. Participant 7 highlighted that the behavioural ease of exploiting AI, adding that it is “challenging, because copy and paste is easier,” implying that AI’s efficiency may encourage immoral shortcuts. Notably, Participant 4 responded with “no thought”,

possibly showing a lack of interest or understanding in the ethical concerns of AI. This reaction could represent a larger issue of insufficient exposure to AI literacy or a lack of interest in the topic, indicating a potential awareness gap among users. The examination of this theme raises concerns about privacy and data protection, the risks of misuse and misinformation, fears about overreliance on AI, academic dishonesty, and the urgent need for ethical guidelines and standards. These responses reflect a broad consensus about the significance of employing AI ethically and responsibly. Participants emphasised the importance of striking a balance by leveraging AI's capabilities without compromising human innovation, critical thinking, or societal values. The findings also underscore the importance of adhering to ethical standards and enforcing policies in ensuring fair and responsible AI research and use.

The responses of the participants are based on two theories: TAM and connectivism. The TAM is relevant because it describes how participants' opinions of the usefulness of AI influence their intention to use it in their studies. Connectivism, which emphasises the importance of networks and ongoing learning, promotes ethical use through digital literacy and deliberate participation. The participants' responses are echoed by Burgos (2024) in Chapter 2, Section 2.2.1.4 where he indicates that the TAM helps to identify potential adoption hurdles, such as resistance to change, ethical concerns, or scepticism about the reliability of AI. When incorporating AI into educational environments, it's vital to consider ethical considerations to guarantee that AI tools increase learning without perpetuating biases or inequities (Khan, 2023). As a result, both theories support this theme as its underlying philosophy.

5.3.1.6 Theme 6: Provision of Resources and Support

The sixth theme aimed to assess the availability of resources and support as a means of addressing the digital era and facilitating the adoption of AI. The participants were asked how institutions can make AI technologies more accessible to students.

The participants' responses demonstrate a strong awareness of the digital divide and its impact on students' ability to access and interact with AI technologies. Many students recommended remedies based on institutional responsibility, emphasising the necessity for tangible actions to bridge the gap. A common belief among the participants was that universities should ensure the availability of technology through direct provision. Responses such as "provide free access", as expressed by Participant 1, and "installing the application for free for them", as stated by Participant 4, demonstrate that some participants felt institutions should provide free or subsidised access to software and equipment. Suggestions that AI tools be included in loan programs further support the idea of hardware accessibility. For example, Participant 5 said, "AI is only accessible through the use of technologies, so the university should have a laptop use program that may be incorporated into the fees." Participants 12 reiterated this, emphasising that "loan programs for laptops and data packages" were one way that institutions could provide assistance. Another major obstacle identified was connectivity, especially for students from low-income families. "Data provision to students of low-income households" was mentioned by Participant 10, highlighting the necessity of including reasonably priced internet access in any plan. Several participants argued for better on-campus amenities, acknowledging that not all students have access to computers or dependable home internet. For example, both Participants 6 and 15 advised that universities "install AI in libraries" and "set up computer labs where students can freely use AI tools", respectively, highlighting the importance of physical places in ensuring equitable access.

In addition to infrastructure, participants emphasised the importance of developing digital literacy and skills. It was widely acknowledged by the participants that support and education were necessary in addition to technological availability. A "workshop that is going to be teaching students about the new technologies" was proposed by Participant 2, and "courses on the safe use of AI and different free platforms available" was suggested by Participant 16. These opinions align with the emerging understanding that

competent, self-assured users are crucial to the successful application of AI as tools. Participant 6 emphasised the importance of both “basic training” and an acceptable lab setting. This emphasises how resources and infrastructure are not confined to physical buildings but also extend to equipping students with digital literacy and the training required for efficient use of these resources. In addition to the technical and physical setup (such as lab facilities and connectivity), this subject of resources and infrastructure also encompasses the students’ ability to utilise these resources efficiently. The analysis emphasises that the sheer existence of infrastructure is insufficient for meaningful academic interaction in the absence of digital literacy and training for both lecturers and students (Qiao, Yeung & Chu, 2023). Some responses suggested greater institutional commitment and policy integration. Integrating AI regulations into education can help enhance academic integrity, as institutions will have clear policies for the responsible use of AI. This argument’s findings are similar to those of Fudge *et al.* (2022) in Chapter 3, section 3.2.11, who argued that, in order to combat this, educational institutions and instructors should implement moral AI policies that maintain academic integrity and value genuine students. Universities should “make technology accessibility and provision a part of the rules”, according to Participant 11, indicating a desire for systemic change. As stated by Participant 14, “universities together with government must partner with technology companies to provide free or discounted access to AI platforms for students”.

Several participants emphasised the importance of collaboration among academic institutions, the government, and tech firms to provide students with free or heavily discounted access to AI platforms. In addition to ensuring that educational institutions stay current with new technological developments, these collaborations would alleviate financial barriers for students from low-income families (Chari, 2024). Adding AI to existing courses and providing training in basic AI literacy was another collaborative concept. With the help of lecturers and institutional mechanisms, students would be exposed to AI in a systematic way if it were incorporated into curricula across disciplines (Chan, 2023). Examples of this include teaching students how to use free AI tools safely

or utilising AI for simulations in particular domains. Additionally, participants thought about integrating AI into the curriculum and systems. For example, Participant 8 said, “AI tools must integrate with the software that is being used in the universities and also make policies that will guide students on how to use AI.” Participant 7 echoed this institutional approach, emphasising the significance of “creating tailored institutional AI platforms”. Participant 3 stated that “Fortunately, most participants have smartphones and there are libraries at institutions, so I don’t think access is still a challenge.” The premise that technology has expanded sufficiently is reflected in this response, which contrasts with the majority’s belief that there are still big obstacles, particularly for underprivileged students.

Numerous responses stated that better campus facilities, organised training programmes, free access to devices and apps, and supportive institutional policies are all necessary. Additionally, all participants agreed that closing the digital divide requires a comprehensive strategy that incorporates equality, policy, education, access, and equipment. Despite differences in tone and focus, the main premise remains the same: universities must adopt inclusive, student-centred policies to ensure that AI technologies are accessible to all students, regardless of their financial situation. The OECD highlights that when used carefully, AI tools can promote fairness and inclusion in education by customising learning experiences to meet the needs of each learner, thereby addressing obstacles such as access problems and inherent biases (Gottschalk & Weise, 2023). Technology resources were frequently mentioned by participants as both a problem and a solution for obtaining AI tools. Devices like laptops were emphasised, and lending programmes for these kinds of devices were also suggested. Several participants noted that the availability of free software and applications made it easier for them to access and utilise AI tools, serving as essential facilitators in their learning process. Access to the internet has also become a vital resource, and for students without personal devices, computer laboratories were considered essential physical access points within the institution’s infrastructure. The software platforms that universities currently employ

should be integrated with AI tools. No follow-up interview questions were necessary for this theme, as the responses provided were sufficient to address the research questions. The table below provides a summary of the 16 responses analysed above.

Table 5.6: Summary of Theme 5: Provision of Resources and Infrastructure

Topic	Participants Aligned	Common View
Need for Free / Equitable Access	P1, P4, P5, P10, P12, P14	Institutions should remove financial barriers by providing free or subsidised access to AI tools and technology.
Infrastructure Matters	P6, P12, P15	On-campus facilities like labs and libraries are essential for equitable access.
Digital Literacy and Training	P2, P6, P16	Training and awareness programs are needed to help students use AI tools effectively and safely.
Policy and Institutional Support	P7, P8, P11, P14	Universities must create policies, integrate AI in curricula, and partner with external stakeholders.
Perception of AI as an Essential Academic Tool	P13, P8	AI should be integrated like a digital library or learning platform.

The participants' shared experiences underscored the importance of well-defined regulations to encourage and regulate the use of AI in higher education. Such policies not only guide good AI integration but also make significant contributions to institutional policy development. In light of this, the next section presents the analysis of the relevant institutional policy document.

5.4 FINDINGS FROM DOCUMENT ANALYSIS

This section presents the findings from analysing one guideline document selected from the institution where the research was conducted. The guideline discussed in this section is one specific policy guideline that closely relates to the research objectives of the study and the responses of the participants, underscoring its applicability for further examination. The checklist provided in Chapter 4, Section 4.5.3.3 (Table 4.0.1) served as a guide for document analysis. This ensured that the analysis remained systematic, rigorous, and focused on obtaining information directly related to the objectives of this study.

The document analysis was also employed for triangulation purposes to validate findings from other data sources, thereby enhancing the credibility of the study. The data triangulation involved examining both the document (AI guidelines) and the participant questionnaire and interview responses. This approach helped to cross-verify findings and increase the trustworthiness of the findings. A guideline provides academics with a methodical way to examine documents through an organised lens. A guideline is a useful tool for thorough document analysis because it allows researchers to spot trends, classify data, and analyse how the text frames issues, conveys authority, and creates meaning (Goldsmith, 2021). Document analysis is employed in this study to examine how the selected guideline aligns with and supports, or contradicts, the findings from the interviews and questionnaire. As previously mentioned in Sections 1.7.2.2 and 4.5.3.3 of Chapters 1 and 4, one guideline document was examined, namely *"The Guidelines for Artificial Intelligence in Teaching, Learning, and Research."*

This guideline addresses the application of AI in educational activities, which helps achieve the study's goals. The guideline present generative AI (GAI) as a transformational but tightly regulated instrument in higher education. The guideline further recognises the

expanding use of AI tools such as LLMs and underline that, while these technologies improve efficiency and help in teaching, learning, and research, their application must be guided by ethical and pedagogical norms. The principles are based on a normative framework that emphasises responsibility, transparency, equity, and constant oversight while also balancing innovation and risk minimisation. Given the critical role that institutional policies play in shaping practices within HE, document analysis was selected as an appropriate method for this study. Pedagogically, the guideline' conclusions encourage for critical engagement, reflection, and context-based use of AI-generated content, rather than simply replicating AI output as student work. Equity and access are emphasised, recognising discrepancies in technological access between students and school/faculty, while data privacy, bias, and verification are emphasised as critical for ensuring ethical and accurate AI use. Similar to the participants' findings on chapter 5, section 5.3.1.6, the guideline proposes continued institutional support, such as staff and student training, as well as periodic reviews of AI integration methods, to ensure that adoption remains successful, ethical, and aligned with learning outcomes.

According to the guidelines, AI-influenced work should be evaluated based on the student's own thinking and knowledge, with the goal of ensuring that any use of AI is transparent, ethical, and does not replace actual academic effort. Assessors must ensure that students can read, assess, and defend AI-generated work, and that their submissions demonstrate true learning, critical engagement, and discipline expertise rather than unverified outputs from generative technologies.

5.4.1 CHARACTERISTICS AND OVERVIEW OF THE SELECTED GUIDELINE

This section examines the document titled "Guidelines for the Use of Generative AI in Learning, Teaching, and Research." The goal of this analysis was to understand how the

guidelines are constructed, what fundamental ideas they support, and how they are intended to be used in educational and research settings. The university created the Guidelines for Academic Integrity in the Use of AI in 2024 to provide organised suggestions for the ethical and appropriate use of AI in instruction, learning, and evaluation. According to the guideline, generative AI tools should only be used in ways that respect academic integrity, promote critical thinking, preserve openness, and give proper credit. It is especially pertinent to the field of public health education, where the integrity and dependability of academic work depend heavily on the responsible application of AI. The guideline is used in this study as a standard by which to evaluate and bolster the results gathered from the interviews and questionnaires. The guideline's organised framework enables the researcher to investigate how students' use of AI is influenced by institutional expectations and how these expectations correspond with the behaviours revealed by participants. Understanding the relationship between academic integrity and AI integration in public health education is facilitated by this methodical approach.

Prominent examples of generative AI tools mentioned in the guideline include ChatGPT, Bing Copilot, and Google Bard, all built on LLMs capable of generating coherent and contextually relevant responses (University, 2024). The guidelines note that while these tools can enhance learning by streamlining administrative tasks, supporting personalised learning, and facilitating research, they also carry potential risks for academic integrity, data privacy, and equitable access, aligning with the concerns expressed by participants in this study. The guideline provides a policy-based lens through which the study interprets participants' experiences. It clarifies institutional expectations, supports the responsible use of AI, and reinforces findings related to the ethical considerations, benefits, and limitations of AI in education. By linking the policy directly to the observed behaviours and perceptions of participants, this study situates its findings within a broader institutional and ethical context, highlighting both the opportunities and challenges of AI integration in higher education. The guideline presents itself as a dynamic document that

will be revised on a regular basis to keep up with the quick advancements in generative AI to stay current and in accordance with best practices. This guideline document does this by using user experiences, evidence-based insights, and industry-wide trends.

5.5 REFLECTION ON THE FINDINGS OF QUESTIONNAIRES, THE INTERVIEWS AND DOCUMENT ANALYSIS

The findings of the online questionnaire, interviews, and policy document analysis contributed to relevant themes, since some topics shared significant similarities. Themes emerging from participant responses in both questionnaires and interviews were easily identifiable. Similarly, the policy document analysis revealed corresponding characteristics, indicating that participants' perspectives and the institutional policy guideline showed alignment.

The themes that emerged from the online questionnaire and semi-structured interviews, are as follows:

Table 5.7: Emerging Themes

Theme	**Description / Focus**
Increased Availability of Educational Materials	More access to a variety of learning resources
Access to Real-time Data	Ability to access and apply up-to-date information for learning
Most Common AI Tools	Identifying commonly utilised AI tools in educational settings

Student Perceptions and Satisfaction with Common AI Tools in the Digital Age	Assessing students' perceptions on AI's role in education
Perceived Benefits of Utilising AI in the Classroom	Being aware of the benefits AI offers to education
Improving AI Applications in Education	Techniques for improving AI's efficacy and utility in learning environments
AI Adoption Challenges	Challenges and obstacles to utilising AI techniques in higher education
Concerns with Academic Integrity and Ethics	Concerns about plagiarism, misuse, and moral implications of utilising AI
Provision of Resources and Support	AI-powered guidance, training, and support systems for students

This study's findings are consistent with the arguments presented in the selected guideline, which position AI as a transformative educational companion and support tool that influences how students conduct research, write, study, and interact with data in public health and related fields (Chapter 5, Section 5.4.1). In Chapter 5, Section 5.3.1.1, the findings confirmed that AI had enhanced their critical thinking, time management, and level of engagement with their studies. However, in Chapter 3, Section 3.2.7, Vincent-Lancrin and Van der Vlies (2020) pointed out that students may lose their critical thinking skills if they rely on AI technologies without utilising them ethically, which is a glaring indication that there are discrepancies between what the participants say and what the scholars observe. This comparison highlights a discrepancy between the noted difficulties and the imagined advantages. Although adopting AI may boost students' confidence in their critical engagement, research indicates that these feelings might not always result in true higher-order thinking. This suggests that more research is necessary to determine if AI actually promotes critical thinking or merely gives the appearance of it.

According to the study's findings in Chapter 5, Section 5.3.1.2, ChatGPT became the most popular AI tool among students. Participants said they used ChatGPT more often than other resources like Grammarly, or AI-powered learning platforms. As mentioned in Chapter 5, Section 5.3.1.2a, the prevalence findings of high and moderate satisfaction confirmed the notion that students usually regard AI technologies as beneficial. Shur-Ofry (2023) argued with its on-demand information access, tailored support, and quick feedback, AI has the potential to improve educational experiences (Chapter 3, Section 3.2.9).

Better campus infrastructure, planned training programmes, free device and app access, and supporting institutional policies are all required for AI to function and alleviate the digital divide (Chapter 5, Section 5.3.1.6). The policy document analysis revealed that cooperation within the university, ongoing supervision, and regular policy updates are essential for the ethical and successful integration of AI in higher education. These steps are necessary to guarantee that technology is not utilised as a quick cut but rather as a tool for real progress (Chapter 5, Section, 5.4.1.1)

HE has been profoundly impacted by the rapid development of AI technologies, which have brought both new opportunities and difficulties for teaching and learning. AI technologies, especially generative AI, have the potential to improve accessibility, expedite administrative duties, and improve learning experiences. But utilising them also brings up significant issues with academic integrity, pedagogy, and ethics. As a result, educational institutions must create frameworks and rules that support the ethical application of AI while upholding academic norms. The document analysis suggested the effects that institutional practices, policies, and the ensuing ramifications have on academics, students, and the larger educational ecology. This analysis was also echoed in Chapter 3, Section 3.2.5, where Uddagiri and Isunuri (2024) argued that robust ethical frameworks will be needed to guide the development and use of generative AI as its capabilities grow, especially with regard to issues like privacy and disinformation.

The necessity for precise standards for integrating AI has been acknowledged by higher education institutions across the globe. Generally, policies seek to achieve a balance between promoting creative applications of AI and preserving academic integrity. The 2024 *Guidelines for Generative AI Use in Learning, Teaching, and Research*, for instance, offer well-organised suggestions for the ethical application of AI in educational endeavours. These guidelines typically address topics such as ethical decision-making, privacy, proper credit attribution, and transparency. In a similar manner, IMDA and PDPC (2020) expressed the same point in Chapter 3, Section 3.2.13, which acknowledged explainability, openness, and equity in AI-driven decision-making and the development of human-centric AI solutions as crucial principles for the ethical application of AI in Singapore's official AI governance framework.

While proper attribution ensures that any content generated by AI is correctly acknowledged, transparency involves openly explaining how AI tools are used in coursework or examinations. Policies also address data privacy issues by requiring the secure handling of faculty and student data. The issue of data privacy was not only raised by the document analysis but also by Bor and Koech (2023), who stated that while the EU has implemented the AI Act, which places a strong emphasis on data privacy and human rights, other regions, such as parts of Africa, are still developing frameworks, frequently balancing ethical concerns with the pressing need to expand digital access and innovation. Guidelines for making ethical decisions help students choose the right AI applications, avoiding abuse or academic dishonesty. DCDT (2024) reiterated these sentiments in Chapter 3, Section 3.2.13, stating that the guideline's ethical criteria are intended to guarantee that AI systems are created and applied with an emphasis on equity, responsibility, openness, and inclusivity. Typically, teachers, students, and administrative entities provide input during the participatory development of these policies. The practicality, contextual relevance, and alignment of the rules with the academic values of the school are guaranteed by this inclusive approach.

The use of AI tools in higher education necessitates a thorough analysis of teaching strategies. Academics are leading the charge to include AI in curriculum design, evaluation, and feedback systems. AI can help create customised learning materials, automate grading for objective tests, or enhance research by analysing data and synthesising existing literature, for example. Students, however, must receive explicit instructions from their educators on how to use these resources properly.

The use of AI as a supplement to learning, not a replacement for it, and teaching students to differentiate between their own work and AI-generated information are all examples of institutional practices. Students can acquire the abilities necessary to use AI technologies in an ethical and efficient manner by including AI literacy in the curriculum. Practices for assessments are especially delicate. The validity and reliability of assessments must not be jeopardised by the use of AI, according to institutions. To promote critical thinking, reflection, and synthesis, all of which are less vulnerable to AI-generated solutions, this may entail rethinking tasks. HE institutions can also enforce responsibility by requiring students to document their use of AI or by putting detection tools in place.

The ethical use of AI presents both opportunities and challenges for educators and students. AI can enhance learning and digital literacy for students, but concerns exist regarding over-reliance, plagiarism, and unclear intellectual property ownership. To solve these issues, institutions must offer training in AI literacy and ethical standards. AI can assist academics with research and teaching, but it also necessitates adjustments to assessment procedures and the resolution of moral conundrums. Participants raised the topic of AI literacy in Chapter 5, Section 5.3.1.6, suggesting that integrating AI into existing courses and offering instruction in fundamental AI literacy was another cooperative idea. Additionally, Chan (2023) argues that integrating AI into curricula across disciplines will expose students to it in a systematic manner, with the aid of instructors and institutional

processes. In addition to setting an example of ethical AI use for students, professional development and well-defined policies are crucial.

Responsible AI use is essential for preserving reputation, upholding academic integrity, and ensuring fair learning outcomes at the institutional level. Collaboration within the university, ongoing oversight, and policy revisions to support technology as a tool for improvement rather than a shortcut are necessary for ethical AI integration. In Chapter 3, Section 3.2.7, Vincent-Lancrin and Van der Vlies (2020) echoed this analysis from the document analysis theme in a similar way, stating that educational institutions can help students use AI in ways that improve authentic learning and long-term academic improvement by establishing frameworks that encourage responsible use and foster critical thinking skills.

5.6 CONCLUSION

This study's findings were derived from information gathered through questionnaires, interviews and document analysis. This chapter examined the themes that emerged from all of the data sets, presenting both the similarities and differences between them in accordance with the study questions. Every data set demonstrated a certain degree of knowledge, instruction, and comprehension regarding the use of AI in HE. A summary of the study's overall findings and an explanation of the triangulation process of the data were included in the chapter's findings.

In the following chapter, the lessons learned from this study are summarised, conclusions are drawn, and suggestions are made for different stakeholders in higher education in South Africa and other nations with similar ODeL contexts.

CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

“Learning never exhausts the mind; instead, it enriches it.” - Leonardo da Vinci

6.1 INTRODUCTION

The previous chapter presented the discussion and analysis of the findings. This study focused on students' perceptions of the use of AI in public health education within South African higher education. A qualitative research approach was employed, utilising a combination of online questionnaires, semi-structured interviews, and document analysis. This method enabled a thorough analysis of the body of research, a single institutional guideline, and AI adoption trends in Africa and globally.

This chapter synthesises the key findings from Chapter 5 in relation to the literature and theoretical framework discussed in Chapters 2, 3, and 4. The discussion is structured around the research questions, highlighting how the findings illuminate students’ experiences and perceptions of the AI integration in public health studies. Furthermore, the chapter provides critical reflections on the research process, addressing methodological limitations and contextual constraints encountered during the study. Finally, the chapter provides actionable recommendations for institutional stakeholders, policymakers, and educators, as well as suggestions for future research to further advance the integration of AI in African higher education contexts.

6.2 SUMMARY OF LITERATURE REVIEW

The literature review was presented in Chapters 2 and 3. The theoretical framework that led this investigation was examined and presented in Chapter 2. As described in Chapter 2, Section 2.2, the theoretical framework used in this study was chosen to be consistent with the study’s objectives and research question. As mentioned in Chapter 2, Section

2.2, the TAM (Davis, 1998) and connectivism (Siemens, 2005) served as the study's guiding theories as it investigated how students adopted and used AI in public health education. According to the TAM, there are two factors that affect technology adoption: effort expectancy (the PEOU) and performance expectancy (the extent to which a user believes that utilising the technology would improve their performance). Participants' findings that AI tools and applications will enhance their learning outcomes and study efficiency, which can be taken as perceived usefulness, were also reflected in Chapter 5, Section 5.3.1.1.

Connectivism, which complements the TAM, stresses learning as a process of creating and navigating networks in which information is dispersed among individuals, digital platforms, and technical instruments. Connectivism AI-enabled e-learning platforms acted as nodes in the students' learning networks, encouraging information access, peer engagement, and self-directed learning as noted by Downes (2019), Chapter 1, Section 1.6.

Chapter 3, Section 3.2.1's discussion of AI and its impact on HE revealed that AI tools could enhance educational opportunities for a diverse student body, speed up administrative processes, and offer individualised learning experiences (Das *et al.*, 2025). Similar findings can be drawn from the participant data in Chapter 5, Section 5.3.1.3, which showed that participants viewed AI as a strong and adaptable tool that would be crucial to their future careers. In Chapter 5, Section 5.3.1.3, AI is considered a useful tool as it enhances data-driven decision-making, facilitates administrative or research tasks, or improves learning. The literature presented in Chapter 3, Section 3.2.5, showed that OpenAI's ChatGPT is a well-known generative AI platform that facilitates complex queries, content production, and interactive discussions (Singh, 2023). The findings in Chapter 5, Section 5.3.1.2, also revealed that ChatGPT was the most widely utilised AI in education, which is widely regarded as effective. The TAM, which was chosen as the theoretical framework in Chapter 2, Section 2.2, is consistent with the participants'

experiences in suggesting or discovering the successful use of ChatGPT as an AI tool in their educational or academic pursuits. As a result, the TAM remains consistent, as it accurately reflects students' adoption and use of AI tools in higher education institutions.

Begazo *et al. (2023), whose research* was discussed in Chapter 3, Section 3.2.1, reported that technology has also made education more accessible across Africa. Similarly, Reddy (2021), as discussed in Chapter 3, Section 3.2.1 of this study, found that educational applications, SMS-based learning, and offline digital resources, such as low-bandwidth apps and pre-loaded content on tablets, have made learning materials accessible in remote areas.

LMS serve as digital platforms that manage student involvement, facilitate communication between students and teachers, assess performance, and disseminate course information, as revealed in Chapter 3, Section 3.2.6 (Sergeev *et al.*, 2021). Additionally, it was revealed in Section 3.2.6 by Jamro and Jamro (2023), who contended that many LMS platforms, including popular ones such as Moodle and Canvas, include connections with academic writing tools like Grammarly, QuillBot, and Wordtune. The document analysis also confirmed this, stating in Chapter 5, Section 5.4.1, when discussing the chosen guideline policy that these tools are based on LLMs, which are made especially to produce responses to textual prompts that are logical, appropriate for the context, and human-like.

Ossiannilsson *et al.* (2024) concluded in Chapter 3, Section 3.2.9, that AI facilitates collaboration between teachers and students worldwide, enabling them to share knowledge in real-time and overcome geographical barriers, thereby fostering a global learning community. Similarly, Yadav (2025) found in Chapter 3, Section 3.2.12 that AI solutions are most commonly used in virtual learning settings, where they support online learning by offering individualised material distribution, evaluation tools, and real-time feedback mechanisms. This was further confirmed by participants in Chapter 5, Section

5.3.1.1a, who revealed that AI tools are simple to use, customisable, and quick, demonstrating real-time feedback.

In Chapter 3, Section 3.2.11, the study by Fudge *et al.* (2022) addressed the ethical use of AI by students and urged educational institutions and academics to create ethical AI policies that respect academic integrity and appreciate genuine student contributions. Participants also reaffirmed the importance of institutions of HE developing and putting into practice clear compliance protocols and comprehensive student rules or regulations (see Chapter 5, Section 5.3.1.5).

The literature in Chapter 3, Section 3.2.7 confirmed that educational institutions can assist students in utilising AI in ways that enhance authentic learning and long-term academic improvement by putting in place frameworks that encourage responsible use and developing critical thinking abilities (Vincent-Lancrin & Van der Vlies, 2020). Participants viewed AI as a learning tool that should be used critically, ethically, and meaningfully rather than as a replacement for critical thinking, according to the findings in Chapter 5, Section 5.3.1.3b. These findings were consistent with those in Chapter 3, Section 3.2.11.

Research presented in Chapter 3, Section 3.2.10 indicated that it's possible for AI to occasionally provide responses that sound plausible but are factually unsound or lack context understanding (Mitelut *et al.*, 2023). Similarly, Chapter 5, Section 5.3.1.4's findings indicated that information inaccuracy is a serious concern, pointing out that AI technologies can sometimes provide inaccurate or misleading content.

6.3 SUMMARY OF RESEARCH DESIGN AND METHODS

Chapter 4 covered the research design and methods, including participant selection and data collection procedures, as well as the justification for empirical research and the interpretivist research paradigm in depth. The study employed a qualitative, exploratory

approach to gain a deeper understanding of students' experiences with utilising AI in public health education. Data were collected through questionnaires, semi-structured interviews, and document analyses, providing both broad and comprehensive insights. Following data gathering, the study gave an analysis of the data and the key themes that emerged. The following section covered data analysis (see Chapter 4, Section 4.6) and ethical considerations.

The study provides further details on how the site was accessed, how the researcher obtained informed consent for the research to prevent reputational harm, and how ethical measures were addressed (Chapter 4, Section 4.7). Chapter 4, Section 4.7 further elaborates on the importance of avoiding harm, including participant safety, confidentiality, and anonymity. The researcher outlined his responsibilities to the participants, and the findings were released because these were crucial for providing more guidance on how to conduct the study. The study's credibility, transferability, dependability, and conformability subsections were discussed in detail to demonstrate the study's trustworthiness (Chapter 4, Section 4.10). The next section covers the findings and discussions from the empirical research.

6.4 SUMMARY OF FINDINGS AND DISCUSSIONS OF EMPIRICAL RESEARCH

The purpose of the empirical study was to shed light on student experiences of the integration of artificial intelligence in public health studies in HE in South Africa. The researcher used open-ended questionnaire, interviews, and document analysis to generate data.

The participants' biographical data (see Chapter 5, Table 5 1 in Section 5.3), the field of study, gender, age, year, and level, as well as the indication of those who took part in interviews, showed a wide variety.

Most themes were evidently the same across the two data instruments (Chapter 5, Section 5.3.1). The data analysis yielded six major themes that described students' experiences with integrating AI in public health education. Table 6.1 summarised these themes, emphasising the key areas of attention discovered through data analysis. The themes encompassed students' access to educational materials, the AI tools they common use, perceived adoption, problems faced when employing AI, concerns about ethics and academic integrity, and the support and resources needed to ensure fair AI adoption. Each subject captured particular insights from participant replies, resulting in a thorough knowledge of how AI is altering the learning experience at South African higher education institutions.

As demonstrated by Theme 1, which highlights increased accessibility to educational resources, AI is a transformational educational companion and support tool that is altering how students research, write, study, and engage with information in public health and related subjects. This theme emphasises the importance of AI in enabling students to access a broader range of learning resources through AI tools. The most frequently mentioned AI tool, according to Theme 2, was ChatGPT, indicating its broad appeal and perceived efficacy in a range of academic work (Chapter 5, Section 5.3.1.2). The third theme, which affirmed the perceived advantages of utilising AI in Section 5.3.2.3, stated that AI is a strong and adaptable instrument that will be crucial to future employment and academic research. Theme 4, which addressed AI Adoption Challenges, revealed that users clearly need to become more digitally literate, with an emphasis on developing their fast educational skills and their capacity to critically analyse and fact-check AI-generated outputs (Chapter 5, Section 5.3.1.4). However, some students voiced concerns about their peers' limited digital skills, excessive reliance on AI, and inadequate institutional support. The findings also demonstrated that although students acknowledged the promise of AI to enhance academic achievement and personalise learning, unequal access to digital infrastructure persisted, especially in institutions with little funding. The findings of Theme 5's investigation into concerns about academic integrity and ethics

revealed that, to ensure just and responsible AI research and usage in education, effective ethical norms and policy enforcement are crucial. The findings under Theme 6: Provision of Resources and Support showed that educational institutions must provide free laptops, zero-rated websites, and well-equipped facilities like computer labs and libraries to accommodate students from underprivileged backgrounds. With this assistance, all students, regardless of their financial situation, would have equal access to digital resources and be able to take advantage of AI-integrated learning settings. Policy modifications underscore the importance of collaboration within the institution of higher learning and the need for regular policy updates to ensure the successful and ethical integration of AI in HE (Chapter 5, Section 5.5).

Based on these findings, the study proposes an AI framework designed to facilitate the effective integration of AI tools into teaching and learning within South African higher education, with a particular application to public health education. Table 6.1 below summarises the key findings as discussed.

Table 6.1: Key Summaries

Theme / Section	Focus	Key Findings
Theme 1: Increased Accessibility to Educational Resources (Chapter 5, Section 5.3.1.1)	Role of AI in supporting students' access to learning materials	AI acts as a transformational educational companion, altering how students research, write, study, and engage with information. It empowers students to access a wider range of learning resources.
Theme 2: Most Popular AI Tools (Chapter	AI tools most used by students	ChatGPT emerged as the most frequently mentioned AI tool, showing broad appeal

5, Section 5.3.1.2)		and perceived effectiveness across academic tasks.
Theme 3: Perceived Advantages of Utilising AI (Chapter 5, Section 5.3.2.3)	Benefits of AI in learning and future employment	AI is a strong, adaptable instrument crucial for future academic research and employment. Enhances academic achievement and personalised learning.
Theme 4: AI Adoption Challenges (Chapter 5, Section 5.3.1.4)	Barriers to effective AI adoption	Students need improved digital literacy, fast educational skills, and critical analysis/fact-checking abilities. Concerns include peers' poor digital skills, over-reliance on AI, and lack of institutional support. Unequal access to digital infrastructure remains a challenge.
Theme 5: Academic Integrity and Ethics (Chapter 5, Section 5.3.1.5)	Ethical use of AI in education	Ethical standards and policy enforcement are vital to ensure responsible AI use and maintain academic integrity.
Theme 6: Provision of Resources and Support (Chapter 5, Section 5.3.1.6)	Institutional support for students	Institutions should provide free laptops, zero-rated websites, and well-equipped facilities to ensure equitable access to AI-enhanced learning for all students, especially those from underprivileged backgrounds.

Policy Modifications (Chapter 5, Section 5.5)	Institutional policies for AI integration	Successful and ethical integration of AI requires collaboration within institutions and regular updates to policies.
Proposed AI Framework (Chapter 6, Figure 6.5.4)	Guiding effective AI integration in teaching and learning	Based on the findings, an AI framework is proposed to guide the effective integration of AI tools into HE teaching and learning.

6.5 RESEARCH CONCLUSIONS

The main research question, “How do students experience the integration of artificial intelligence into public health studies in South African higher education?” is descriptively addressed by the comprehensive study results in Chapter 5 and the findings summary in Chapter 6.

A synthesis of findings is provided for each study sub-question to investigate and completely address the main research issue.

6.5.1 What are the perceived benefits and limitations of incorporating artificial intelligence into higher education?

The findings demonstrate that AI is a powerful and adaptable tool that will be crucial to students’ future education and careers. AI is a valuable tool that can be utilised to enhance data-driven decision-making, streamline administrative or research tasks, or enhance learning. These findings contribute to the body of knowledge regarding the positive effects of AI on professional and academic development in the fields of public health and education. The findings further showed that the use of AI in studies brings several additional benefits beyond academic support, implying that AI use facilitates

personal development and broader thinking skills for users. Despite the benefits of utilising AI, the research identified challenges that AI sometimes provides inaccurate information. The study further revealed that AI-generated content lacked precision, provided misleading or outdated information, or produced ambiguous and generalised answers. In several cases, AI gives overlapping issues, such as encountering both erroneous content and fake or poor citation techniques, especially when referencing academic sources.

6.5.2 What are the ethical considerations of utilising AI in education?

Linked to Schwartz *et al.*'s (2022) long-standing literature in Chapter 3, Section 3.2.13, which suggested that the deployment of AI without clear policies may result in misuse, bias, or injustice, limiting its transformative ability, the study raised concerns about privacy and data protection, the risks of misuse and misinformation, overreliance on AI, academic dishonesty, and the urgent need for ethical guidelines and standards. The study discovered that a balance must be struck between leveraging AI's potential and damaging human innovation, critical thinking, or social ideals. The study found that AI raises ethical concerns since it can be linked to plagiarism if not used properly, which occurs when students submit their work as original without properly citing their sources. The document analysis revealed that educational institutions can assist students in utilising AI in ways that increase authentic learning and long-term academic performance by building frameworks that encourage responsible use and foster critical thinking abilities.

6.5.3 How does a student's lack of access to technology affect the use of artificial intelligence in education?

The study identified a clear need for enhanced digital literacy among users, with a focus on developing rapid engineering skills and the ability to critically review and fact-check AI-generated outputs. The study found that not providing data to students from low-

income homes had an impact on those students, emphasising the importance of offering fairly priced internet access. The study revealed that there should be improved on-campus amenities, recognising that not all students have access to computers or reliable home internet. The study revealed that AI should be integrated into a digital library or learning platform that provides laptops and other technical resources.

6.5.4 What are the key elements of an AI framework for teaching and learning integration in South African higher education?

The findings indicated that an AI integration framework for teaching and learning should include a number of crucial elements, drawing from both international literature and the context of higher education in South Africa. These include integrating pedagogy, technology support for AI-powered HE, alignment of institutions and policies in AI Integration, utilising AI in HE in an ethical and responsible way, and evaluation and Assessment in AI-powered HE. When considered collectively, these factors provide a framework for a sustainable and contextually sensitive approach to integrating AI into HE.

The following AI framework is proposed for teaching and learning integration in South African HE:

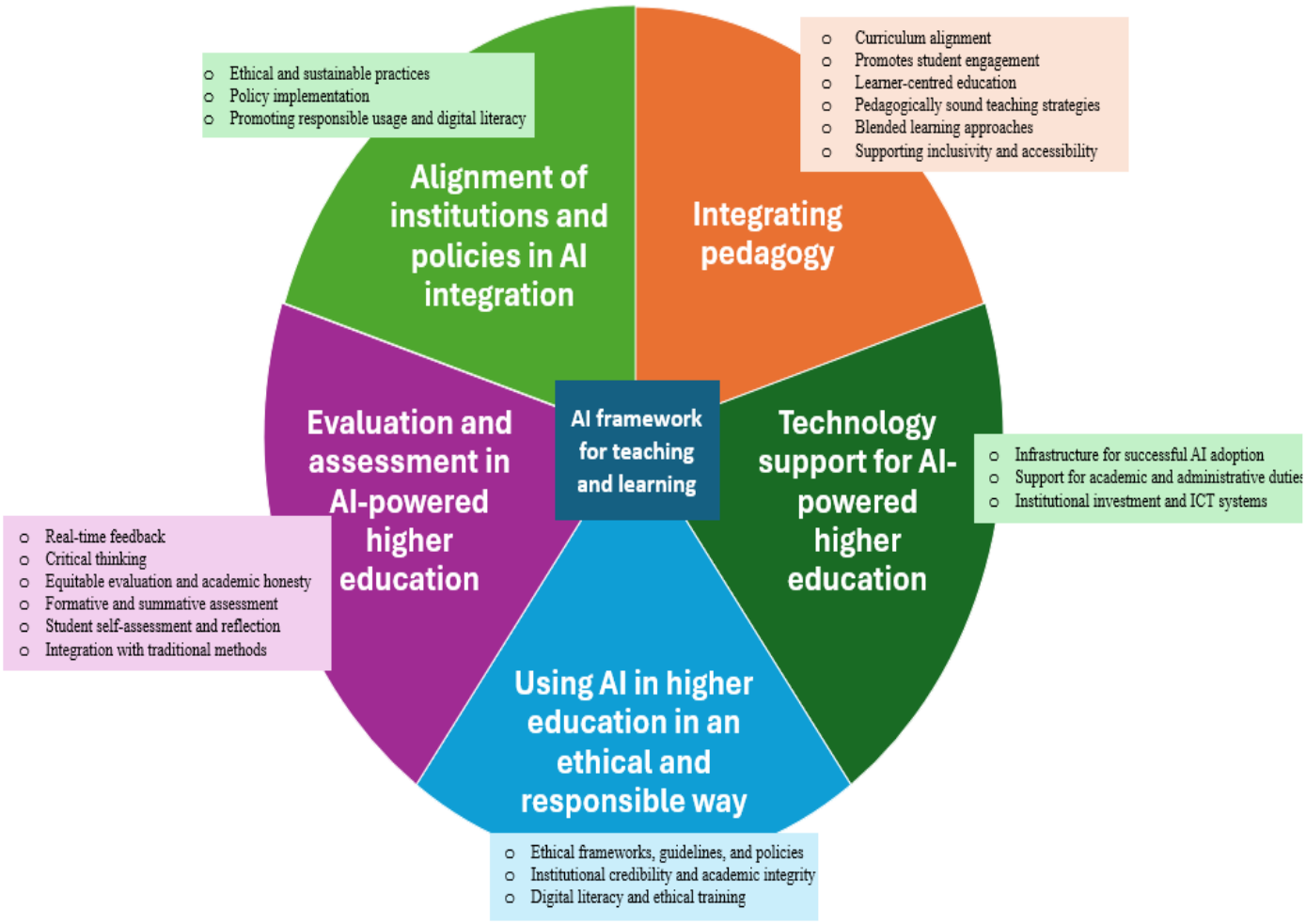

Figure 6.5.4: AI Framework for Teaching and Learning Integration in South African HE (Author's own design)

The different aspects of the proposed framework are discussed next.

6.5.4.1 Integrating Pedagogy

It is commonly acknowledged that incorporating AI into pedagogy can improve the processes of instruction and learning. From the standpoint of advantages, AI-enabled systems facilitate immersive simulations that meet a variety of learner needs, adaptive feedback, and personalised learning pathways. Additionally, real-time learning analytics let teachers track student development, spot learning gaps, and provide focused interventions, which promotes student engagement and learner-centred education (KAHE, 2025). These opportunities do come with some significant drawbacks, too. One major challenge is the possible over-reliance on AI tools, which could impair students' ability to think critically, be creative, and solve problems on their own. This AI dependence can unintentionally encourage students to follow algorithmic recommendations rather than utilising more sophisticated cognitive processes, which is known as passive learning (Yavich, 2025.). Furthermore, this dependence may worsen already-existing disparities if students are not equipped with the digital literacy needed to successfully traverse AI-enhanced environments.

In AI-mediated schooling, academic integrity also becomes a crucial factor. The widespread use of generative AI technologies puts traditional evaluation models that rely on standardised testing and rote memorisation to the test. Assessment methods must be redesigned to focus on activities that highlight context-specific problem-solving, applied knowledge, and higher-order thinking to maintain integrity. Strategies including project-based learning, oral defences, and real assessments can lessen the likelihood of academic dishonesty while encouraging intellectual independence and the moral application of AI (Nwozor, 2025).

The researcher proposes that a balanced strategy that capitalises on technology advancements while preserving the essential educational ideals of autonomy, creativity, and academic integrity is needed for the pedagogical integration of AI.

6.5.4.2 Technology Support for AI-powered Higher Education

Since technological infrastructure promotes both institutional efficiency and pedagogical innovation, it serves as the foundation for the successful adoption of AI in HE. The increased availability of digital materials is one of the main advantages, as it enables instructors and students to interact with a variety of OER, adaptable platforms, and intelligent tutoring systems from any location. AI-powered automation of standard academic and administrative duties, like scheduling, grading, and student support, has also been demonstrated to increase institutional efficiency and free up academic staff members to concentrate on more intricate research and pedagogical endeavours (Khairullah *et al.*, 2025).

Notwithstanding these benefits, infrastructure constraints continue to be a major obstacle, especially in countries like South Africa, where a lack of digital devices, inadequate bandwidth, and unequal access to the internet all contribute to a widening digital divide (van Dijk, 2020; Maphoto, 2024). These differences run the risk of escalating socioeconomic inequities in HE in addition to limiting students' ability to fully engage in AI-mediated learning. Furthermore, the scalability and sustainability of integrating AI into teaching, learning and administration may be hampered by insufficient institutional investment in strong ICT systems.

The role of technology infrastructure is further complicated by academic honesty. Institutions must ensure that platforms are safe, open, and resistant to abuse when AI is incorporated into evaluation systems. This involves taking precautions against plagiarism, unauthorised access, and relying too much on generative AI to finish schoolwork. Furthermore, to avoid favouring already privileged groups, equity considerations require that access to safe, AI-enabled platforms be dispersed equally throughout various student populations. Therefore, it is important to portray technology infrastructure as a crucial aspect of equity, trust, and responsibility in HE rather than just as a technical issue. Strong

infrastructure is a major factor in facilitating the integration of AI; yet, to guarantee that the adoption of technology enhances rather than compromises ethical and equitable education, it is crucial to address digital inequality, institutional preparedness, and system security.

6.5.4.3 Alignment of Institutions and Policies in AI Integration

For AI to be integrated into HE in a way that is both ethical and sustainable, the researcher recommends that institutional and policy coherence is essential. Well-crafted frameworks offer administrators, lecturers, and students precise instructions, encouraging the consistent and responsible application of AI in teaching, learning, and evaluation. Since these organisations provide national standards for curriculum design, accreditation, and quality assurance, alignment with the Department of Higher Education and Training (DHET) and the Council on Higher Education (CHE) is very important in the South African environment. Similar policy-driven frameworks around the world (such as UNESCO's recommendations for AI in education) emphasise how crucial it is to incorporate AI integration into larger regulatory and governance frameworks in order to guarantee that technological adoption stays accountable and contextually relevant (Khan *et al.*, 2024). There is a disconnect between the potential of AI and its controlled application, though, as policymaking frequently lags behind technological advancement. Because of this policy lag, institutions may experiment separately, resulting in fragmented implementation, uneven practices, and possible disparities throughout the sector (Wiggill, 2023). The varying rates of digital policy implementation in historically disadvantaged and privileged South African universities worsen systemic disparities and cast doubt on the coherence and scalability of AI integration plans.

Academic integrity is an additional aspect that necessitates clear policy formulation. Traditional ideas of originality and authorship are being challenged by the emergence of generative AI tools, which calls for precise guidelines on what constitutes appropriate and

inappropriate usage of AI in academic writing. For instance, policies should outline rules regarding the ethical limits of AI-assisted learning, transparency in student contributions, and the proper citation of AI technologies. Without this clarity, both students and teachers run the risk of inadvertently or actively engaging in behaviours that compromise integrity. Adoption of AI is facilitated and protected by institutional and policy alignment. Robust, adaptable regulations foster an atmosphere in which AI can be used to innovate while guaranteeing adherence to moral and quality requirements. On the other hand, policy development delays and fragmentation run the risk of compromising trust, consistency, and equity in the application of AI in HE.

6.5.4.4 Utilising AI in Higher Education Ethically and Responsibly

A key component of long-term technology integration in higher education is the ethical and appropriate application of AI. When carefully included, ethical frameworks foster responsible innovation, openness in decision-making, and trust between students, teachers, and the general public. Institutions that place a high priority on ethical use demonstrate their dedication to protecting students' rights while simultaneously utilising AI to improve administrative, instructional, and learning effectiveness. Students' trust in AI-enhanced systems and institutional credibility can both be improved by this alignment of innovation and responsibility (Floridi & Cowls, 2019; UNESCO, 2021).

However, unresolved moral conundrums present serious obstacles to adoption. In situations where students and staff may not be fully aware of how their personal information is gathered, stored, and used, worries about data privacy, ownership, and algorithmic spying are more pressing. These problems are made worse by the fact that many AI systems are "black boxes", with opaque decision-making procedures that raise concerns about accountability, prejudice, and justice (Jamil, 2025). Since students from marginalised backgrounds may be more susceptible to exploitation or exclusion if ethical

precautions are not ingrained in institutional processes, these problems in South Africa overlap with more general issues of inequality.

In terms of academic integrity, adherence to national and international standards is essential. At the local level, compliance with the Protection of Personal Information Act (POPIA) provides a legislative framework for ensuring the privacy, security, and ethical management of academic and personal data. Respect for intellectual property, equity, and transparency is upheld by organisations worldwide when they adhere to standards like the OECD Principles on AI and UNESCO's AI ethics principles. The researcher proposes that incorporating these guidelines into institutional regulations ensures that AI adoption aligns with academic ideals of integrity, responsibility, and respect for intellectual contributions, while also reducing the potential for misuse. A vital precondition for fair, reliable, and long-lasting integration in HE is ethical and responsible use of AI, not just a supplementary component of its use. In an era mediated by AI, the researcher proposes that institutions that disregard this aspect run the risk of jeopardising academic systems' reputation as well as students' rights.

6.5.4.5 Evaluation and Assessment in AI-Powered Higher Education

HE's efficiency and responsiveness could be greatly improved by incorporating AI into assessment and evaluation procedures. AI-powered solutions can provide students with instant feedback, expedite the grading of objective tasks, and generate analytics to inform instructional interventions (Scholapurapu, 2025). By making it possible to quickly identify learning gaps and provide tailored recommendations for improvement, these capabilities not only lessen the administrative responsibilities on academic staff but also promote formative assessment procedures**.**

However, there are significant drawbacks to depending solely on computerised evaluation. Even though AI systems are effective, they could not fully grasp how

complicated student learning is, especially when it comes to tasks that call for creativity, critical thinking, or sophisticated arguments. Assessments that are standardised or algorithmically evaluated run the danger of favouring quantifiable results over more complex cognitive abilities, which could limit the scope of learning and undervalue a variety of problem-solving techniques (Bablu, 2024). To guarantee that comprehensive learning outcomes are acknowledged, this constraint emphasises the necessity of carefully calibrating AI assessment methods and supplementary human review.

One of the most important factors in AI-mediated evaluation is academic honesty. Traditional assessment models are being challenged by the widespread use of generative AI and automated content generation technologies, which calls for techniques that are impervious to abuse. Institutions must create tests that prioritise applied problem-solving, creativity, and higher order thinking above simple memorisation. While upholding strict standards, strategies including project-based assessments, oral defences, real-world assignments, and reflective assignments might reduce the likelihood of academic dishonesty (Nedyalkov, 2023). To maintain fairness, legitimacy, and trust in academic evaluation processes, the researcher proposes that it is imperative that AI tools be employed as supportive rather than determinative in assessment.

Even though AI-enabled assessments are efficient and provide real-time feedback, a balanced strategy is necessary for their successful adoption. To make sure that technology improves rather than detracts from the calibre and equity of student assessments, educational institutions must combine AI tools with pedagogically sound, integrity-focused assessment practices that prioritise creativity, critical thinking, and equitable evaluation.

The main research question of the study, *"***How do students experience the integration of artificial intelligence in public health studies within South African higher education?"** is covered in detail below.

Based on the empirical findings, AI is a valuable educational tool that helps students improve their learning processes and academic performance. Despite its benefits, students regard AI as a source of potential mistakes, underlining the importance of verifying AI-generated knowledge utilising trusted academic sources before utilising it in assessments.

Drawing on these findings, the researcher developed a framework that prioritises pedagogical integration via curriculum alignment with AI technology as well as institutional support for blended learning approaches. Such alignment would make it easier to effectively adopt, monitor, and evaluate AI integration in HE. Furthermore, institutional policies must be modified to help both students and lecturers in the appropriate use of AI, ensuring ethical and informed interaction with developing technology.

In addition, assessment systems should be developed to protect critical thinking and academic quality while embracing AI-assisted learning. Institutions must also bridge the digital gap by providing students with necessary resources such as low-cost or free internet access (including zero-rated educational websites), data assistance, and laptop computers. These indicators are critical for promoting fair access and meaningful engagement in AI-enhanced learning environments across higher education. The limitations of the study are discussed below.

6.6 LIMITATIONS

Like all research, this study has its limitations. The main limitation of this study is that only one HE institution in South Africa was used. Even if the study's data was adequate and

achieved saturation, it would have taken a different approach if more universities or faculties had been included. The study was limited to a single institution and a small number of students' perspectives and experiences with AI integration in HE.

The non-participants in the pilot study took time to respond, to the point where the researcher had to follow up several times to collect input to adjust the questionnaires. Another issue was how some participants would postpone interviews, citing their schedules as the reason for their absence. The data analysis was delayed because some participants were doctors working in the wards, who stated that their hospital or work schedule prevented them from responding to the questionnaire or interviews, while others cited exam schedules. Despite the limited number of universities, participants, and schools, the study topics could still be addressed. This study offered valuable information and an in-depth perspective of the participants' experiences with AI integration in South African HE. The investigation attained saturation and was qualitative in nature.

6.7 RECOMMENDATIONS

The findings of the study suggest that to improve the quality of education, Higher Education Institutions (HEIs) should deliberately include AI tools into teaching and learning. Institutions should place a high priority on funding AI infrastructure, ongoing employee development, and student-centred strategies that encourage the ethical and responsible use of AI technologies. To enhance student performance, lessen academic workload, and promote sustainable student throughput, a clear AI integration approach is required.

For this reason, the recommendations are as follows:

6.7.1 Institutional Recommendations

HEIs, instructors, and students must adjust to the quick integration of AI technology in teaching and learning in the digital age. Therefore, the study recommends that for HEIs to fully integrate and successfully implement the use of AI in education, there should be policies governing the use of AI in all institutions. Authorship, plagiarism, and data privacy should all be covered by these regulations or policies, which should also promote creativity and the ethical use of new technology. This will help to maintain educational quality when employing AI in education as well as academic integrity. The study also recommends that universities adopt software platforms with integrated AI capabilities and that more free, zero-rated websites be made available to students, as leveraging AI in this manner will help reduce the digital divide among students. Training and seminars should be given top priority by institutions to equip staff and students with the digital skills they need to utilise AI products effectively. This entails being able to evaluate AI-generated content critically and comprehending how AI works as well as its advantages and disadvantages. Comparative studies between institutions are necessary to determine how AI is being incorporated differently in traditional versus ODL settings.

6.7.2 Recommendations to Academics

The application of AI in higher education should be aggressively promoted in a critical and responsible manner. Students should be expected to acknowledge any use of AI in their academic work and ensure that their interaction with AI tools enhances their learning. Furthermore, they should be taught how to verify and correctly cite any scholarly text or references generated by AI to maintain academic integrity. To reduce the possibility of misuse, assessments such as tests and examinations should be administered in

controlled venues, such as university facilities, where invigilators can properly supervise student activity. Oral presentations, such as viva voce, can also be used for assessments to determine whether students are the right authors of their academic work. Implementing these steps will encourage ethical and constructive AI use, improve students' critical thinking skills, and ensure that AI is used as a supportive learning aid rather than a shortcut in academic tasks.

6.7.3 Recommendations to Students on the use of AI

Students are encouraged to use AI tools as helpful learning aids, rather than relying on them to replace independent thought and academic work. When utilising AI, students should critically assess the generated content to determine its veracity, correctness, and applicability to their coursework. Students must recognise and cite the usage of AI tools where appropriate to uphold academic integrity and openness.

Additionally, students should focus on utilising AI to enhance their comprehension, refine their writing and analytical skills, and increase productivity, for instance, by organising data, correcting grammar, or summarising. Avoid relying too much on AI-generated content, though, as this could stifle critical thinking, creativity, and human interaction. It is also recommended that students become familiar with the institutional norms that govern the use of AI to ensure adherence to academic and ethical standards. Students may contribute to an innovative and honest culture in HE while also improving their educational experience by carefully and ethically integrating AI.

6.8 SUGGESTIONS FOR FURTHER RESEARCH

Based on the findings of this study, future research could investigate how academics' and students' opinions of AI change over time, especially as HEIs develop clearer policies, ethical guidelines, and training efforts. Additional research could examine how AI

technologies are used and accepted at various universities, including South African and international institutions, to identify best practices and contextual variations in adoption and application.

Furthermore, by contrasting its use in public health, humanities, engineering, commerce, and science, for instance, future studies could examine how AI is applied across all academic fields. Examining the ethical implications of using AI in education and evaluation may also be beneficial, with a particular focus on concerns about algorithmic bias, data privacy, academic integrity, and transparency. It is also recommended to look at the quantifiable impacts of integrating AI on academic achievement, learning outcomes, and student engagement. Studies examining the function of digital literacy and capacity building programmes may provide insight into how training affects employees' and students' preparedness to use AI successfully. Important insights would also be provided by research that focus on the experiences and perspectives of students regarding AI, especially regarding accessibility, inclusion, and the psychological effects of AI-mediated learning. Subsequent investigations may examine the ways in which institutional culture, accessible resources, and policy frameworks influence the efficient and moral application of AI in HE.

6.9 CONCLUSION

Currently, institutions face the essential task of providing students with the skills needed to navigate professional situations moulded by AI-driven transformation. However, this study discovered not just limitations to the use of AI, but also opportunities and best practices that show how AI might be usefully integrated into teaching and learning processes. The study found that while institutions frequently face conceptual and ethical concerns about AI adoption, there is a rising acknowledgement of its potential to improve student engagement, personalise learning experiences, and assist instructors in decision-

making and evaluation. This work increases our understanding of how AI is integrated into learning in HE by combining empirical evidence and theoretical views.

The framework developed based on the findings of this study provides guidelines for educators, institutions, and governments looking to integrate AI in ways that improve teaching, learning, and evaluation. The framework emphasises the need for educational intent, ethical awareness, and contextual sensitivity while implementing AI tools in HE. Rather than focusing on individual technology, the framework emphasises the fundamental pedagogical and ethical factors that ensure AI integration is both learner-centred and sustainable. In this sense, it serves as a basic framework for promoting responsible and successful AI deployment, which contributes to the continued evolution of remote learning. To effectively participate in these changing environments, students must be equipped with both conceptual knowledge and digital intelligence. The purposeful integration of AI in higher education has the potential to enable students to thrive in technologically advanced and constantly evolving workplaces.

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Appendix A

ONLINE QUESTIONNAIRE

STUDENT EXPERIENCES OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE (AI) IN PUBLIC HEALTH STUDIES IN HIGHER EDUCATION IN SOUTH AFRICA

Information provided will be kept confidential and used purely for the purpose of the research.

RESEARCH CODE: TFODL01

DESCRIPTION: PhD - EDUCATION - OPEN DISTANCE LEARNING

Gender

Male

Female

Age

22 - 24 years

25 -29 years

30 - 39 years

40 -49 years

50 years +

Year of study

Year of study 1

Year of study 2

Year of study 3

Year of study 4

Level of study

PGDip

Honours

Masters

PhD

Field of study, e.g Paediatrics

1. What effects has the use of AI had on your education in public health studies?

Had a significant effect

Had an adequate effect

Had no effect

Had a negative impact

1a. Please explain your choice and how AI has changed your learning experience in public health studies.

2. Which AI tools were most accessible and beneficial in your studies on learning platforms?

3. What would you say about your level of satisfaction with AI's incorporation in the digital era?

4. Which aspects of AI tools (e.g., speed, accuracy, customisation, and ease of use) have the biggest effects on your learning satisfaction, and why?

5. Which part does AI play in your future career in public health or education, in your opinion?

6. Which challenges did you encounter when employing AI for your studies?

7. What are your thoughts on the ethical implications of employing AI?

8. How can universities make AI technologies more accessible to students who lack access to technology?

9. What suggestions would you give to future students to better incorporate AI into their learning?

10. What additional rewards/benefits have you experienced from using AI during your studies?

11. Would you be willing to participate in a brief follow-up interview should the need arise during the course of the study?

Yes

No

12. If yes, kindly provide your email address to schedule a follow up meeting at your convenience

Appendix B

PARTICIPANT 1

Question 1
Has your satisfaction with AI tools been consistent across different courses or tools? Are there any areas where you still see room for improvement despite being satisfied? Will you recommend AI to others?

Question 2
How does AI improve grammar or writing on your studies?

Question 3
Do you feel you can trust the information or feedback provided by AI tools? How do you decide when to rely on AI versus your own judgment?

Question 4 (AI tools)
You mentioned the use of ChatGPT, Quillbot as the most commonly used AI tools by yourself and what motivated you to try them?

Question 5
In what ways has AI saved you time or effort when employing it?

Question 6 (Benefits)
In your experience, how does the incorporation of AI differ from traditional methods of instruction? Did AI encourage you to think differently or approach a problem in a new way?
To what extent did AI help you develop new skills or confidence? Which is more important to you in learning speed or accuracy and why?

Question 7 (Challenges)
With tools that are free apps, who does the ones with subscriptions assist in the use of AI? You mentioned issues with the AI platforms, can you explain what didn't work well? Did you receive any support to deal with that challenge?

Question 8 (Ethical implications)
Do you feel that your personal data is protected when using digital learning platforms or AI tools?

How do you think universities should address ethical issues in the use of emerging technologies?

What risks do you think students face when learning is mediated through AI or online systems?

Question 9 (Digital divide)

Has your university provided any support to help bridge the digital divide?

What more do you think institutions should be doing to address this issue?

What strategies do you use when you face challenges, be when there is loadshedding?

UNISA university of south africa

Appendix C

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 12 September 2024

Ref: **2024/09/12/000000165/04/RB**
Name: **Mr Stephen Mongwe**
Student No.: **39426610**

Decision: Ethics Approval form

Dear **Mr Stephen Mongwe**

Researcher(s): Name: **Mr Stephen Mongwe**
E-mail address: 39426610@mylife.unisa.ac.za
Telephone: **076 950 0911**

Supervisor: Name: **Prof G van den Berg** and **Prof PK Mudau**
E-mail address: vdberg@unisa.ac.za and mudaupk@unisa.ac.za
Telephone: **0829219771** and **0829532090**

Title of research: STUDENT EXPERIENCES OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN PUBLIC HEALTH STUDIES IN HIGHER EDUCATION IN SOUTH AFRICA.

Qualification: PhD in Education (ODL)

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above-mentioned research. Ethics approval is granted for the period **2024/09/12** to **2029/09/12**.

*The **write risk level** application was reviewed by the Ethics Review Committee on **12 September 2024** in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
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2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date **2029/09/12.** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2024/09/12/00000165/04/RB** *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,

Prof RB Monyai
Acting Head: CEDU Research
monyarb@unisa.ac.za

Prof Mpine Makoe
Executive Dean: CEDU
gakisme@unisa.ac.za

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JOHANNESBURG

SCIENCES

Appendix D

18 October 2024

Mr Stephen Mongwe
UNISA

Permission to conduct research for Doctor of Philosophy in Education

We refer to your request to conduct research as part of your Phd studies in Education at UNISA under the title: **"STUDENT EXPERIENCES OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN PUBLIC HEALTH STUDIES IN HIGHER EDUCATION IN SOUTH AFRICA"** with currently registered students at the Faculty of Health Sciences

This letter serves to confirm that permission is hereby granted for the study, provided that the information is used for this purpose only and that all protocols and research ethics are adhered to.

We wish you success with your studies.

Regards

Faculty Registrar: Faculty of Health Sciences
E-mail:

UNIVERSITY OF TIIE | OFFICE OF THE DEPUTY REGISTRAR

23 October 2024

Appendix E

Stephen Mongwe
Doctor of Philosophy in Education
UNISA

TO WHOM IT MAY CONCERN

"Student experiences of the integration of artificial intelligence in public health studies in higher education in South Africa."

This letter serves to confirm that the above project has received permission to be conducted on University premises, and/or involving staff and/or students of the University as research participants. In undertaking this research, you agree to abide by all University regulations for conducting research on campus and to respect participants' rights to withdraw from participation at any time.

If you are conducting research on certain student cohorts, year groups or courses within specific Schools and within the teaching term, permission must be sought from Heads of School or individual academics.

Ethical clearance has been obtained. (Protocol number: 2024/09/12/00000165/04/RB)

Research Expiration: (12 September 2029)

University Deputy Registrar

Appendix F

STUDENT EXPERIENCES OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE (AI) IN PUBLIC HEALTH STUDIES IN HIGHER EDUCATION IN SOUTH AFRICA

Dear Potential research participant

You are invited to participate in an online questionnaire that forms part of my Doctor of Philosophy in Education – Open Distance Learning. The procedure involves completing an online questionnaire which will take approximately 20 -30 minutes. All information, personal or otherwise, will be collected, processed and stored in accordance with, and observant of the Protection of Personal Information Act 4 of 2013.

You will not be eligible to participate in this study if you are not registered student at [redacted] Please note that you will not be paid to participate in the study. Participation in this study is voluntary. The identity of all participating institutions, participants and their responses will be treated anonymously and as confidential. Participants may withdraw at any stage.

No harm will be inflicted upon any participants. The data will be regarded as confidential and kept safely on my computer, with necessary security codes, or locked in a cabinet when printed, and by not allowing any unauthorised persons access to the data.

Consent

By signing or submitting this form, you confirm that:

- You have read and understood the information above.
- You voluntarily agree to participate in this study.
- You understand that you can withdraw at any time without penalty.

Name of Participant: _____

Signature / Digital Acknowledgment: _____

Date: _____

Thank you

Mr. Stephen Mongwe

Appendix G

Effective ENGLISH EDITS

CERTIFICATE OF EDITING

THIS IS TO CERTIFY THAT THE FOLLOWING DOCUMENT

STUDENT EXPERIENCES OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN PUBLIC HEALTH STUDIES IN HIGHER EDUCATION IN SOUTH AFRICA

BY

S. MONGWE

HAS BEEN PROFESSIONALLY EDITED FOR ENGLISH LANGUAGE USAGE BY

EFFECTIVE ENGLISH EDITS

Date: 26 November 2025

Signed: *Sarah Coutts*
Owner & Senior Editor

For any queries regarding this certificate, please contact Sarah Coutts (sarahcoutts1@gmail.com) or on +27 (0)61 652 7283.
Professional Editors' Guild Member (COU001)

EEE/2025/007