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Student Perceptions of Emergency Remote Teaching and Learning at a South African University

by

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Declaration

Here by I, **Nicole McCallum (u29121532)** do solemnly declare that this dissertation had been complied in accordance with the University of Pretoria's Code of Ethics for scholarly activities. Throughout, I have attempted to observe and stay true to the principles of honesty, objectivity, duty of care, and fairness in giving credit and appropriate acknowledgement to the work of others.

Ethics Statement

The author whose name appears on the title page of the dissertation, has obtained the required Research Ethics Approvals/Exceptions for the research described below in this work.

Please refer to Appendix A: Approval from the University of Pretoria Ethics Committee and Appendix B: Approval from the University of Pretoria Survey Committee for verification.

The author declares that she has observed the Ethical Standards required in terms of the University of Pretoria's Code of Ethics for scholarly activities.

Abstract

A brief statement of the Research Question

Towards the end of 2019, China reported a case of unknown pneumonia to the World Health Organization (WHO), and in response, on the 11th of March 2020, they classified COVID-19 a pandemic, prohibiting the movement of people and goods worldwide. As a solution to the social distancing mandate, teaching and learning went online when South African Universities (SAUs) were required by law to physically close their campuses. Currently, published academic literature referred to this learning transformation as emergency remote teaching and learning (ERT/L). The sudden, unplanned educational change disrupted and impacted the way lecturer's lectured and interacted with their students within a traditional classroom environment. For this reason, the online shift created a research opportunity to ask the following research question: What are university students' perceptions of ERT/L at a South African University? Guided by the TPACK perspective, students positively perceived the overall experience, drawing on both the advantages and disadvantages.

Keywords:

University Student Perceptions, Emergency Remote Teaching and Learning, South African University

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My Family: To my husband and mom – I believe in myself because of your love.

To my Father, ALMIGHTY GOD, Jesus Christ, and the Holy Spirit: Your Living Word says, “Stand firm in your faith then I can stand firm in you”. I fall to my knees, praising your name, HOLY, HOLIER AND HOLIEST is YOUR NAME!!!

I would leave these acknowledgements with a final quote from J.C. MAXWELL:

What Attitude is...

Its roots are inward, but its fruit is outward.

It is our best friend or worst enemy.

It is more honest and consistent than our words.

It is the thing that draws people to us or repels them.

It is never content until it is expressed.

It is the Librarian of our past.

It is the Speaker of our present.

It is the Prophet of our future.

Thank you, may the spirit of Ubuntu live on!!!

List and Location of Abbreviations

Alphabetically according to Acronym

Acronym	Full Name	Page #
AAP	Alliance for African Partnership	9
ANOVA	Analysis of Variance	88
ASU	Arizona State University	19
BBA	Bachelor of Business Administration	45
BBC	Blackboard Collaborate	16
BCom	Bachelor of Commerce	47
BMS	Burnout Measure Scale	38
Brief COPE	Brief- Coping Orientation to Problems Experienced	38
CD-RISC	Connor-Davidson Resilience Scale	39
CK	Content Knowledge	9
CoI	Community of Inquiry	4
COVID-19	Coronavirus Disease-19	1
DAPQA	Directorate of Academic Planning and Quality Assurance	34
DMA	Disaster Management Act	1
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders	5
E-Mail	Electronic Mail	16
EFA	Exploratory Factor Analysis	88
ERT/L	Emergency Remote Teaching and Learning	3
F2F	Face-to-Face	3
FB	Facebook	30
GMH-4	General Mental Health Scale	38
GSE	General Self-Efficacy Scale	39
HADS	Hospital Anxiety and Depression Scale	38

Acronym	Full Name	Page #
HAIs	Historically Advantaged Institutions	8
HDIs	Historically Disadvantaged Institutions	8
HE	Higher Education	3
HEIs	Higher Education Institutions	8
HoD	Head of Department	82
HPCSA	Health Professional Council of South Africa	88
ICT	Information and Communication Technology	11
LMS	Learning Management System	16
MBI-GS(S)	Maslach Burnout Inventory General Survey	43
Moodle	Modular Object Orientation Dynamic Learning Environment	16
MSU	Michigan State University	29
NCCC	National Coronavirus Command Counsel	1
NICD	National Institute for Communicable Diseases	1
NUL	National University of Lesotho	53
OCL	Online Collaborate Learning	69
OL	Online Learning	7
P-P	Post-Positivistic	75
PCK	Pedagogical Content Knowledge	9
PICRAT	Passive Interactive Creative Replacement Amplification	69
PIS	Participant Information Sheet	83
PK	Pedagogical Knowledge	9
PP	Power Points	16
PPE	Personal Protective Equipment	11
PSU	Prince of Songkhla University	45
RBL	Resilient Blended Learning	16
RU	Rhodes University	12

Acronym	Full Name	Page #
SAs	South Africa's	1
SAG	South African Government	1
SAHE	South African Higher Education	11
SAJP	South African Journal of Psychology	37
SAMR	Substitution Augmentation Modification Redefinition	68
SAPS	South African Police Services	15
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2	24
SAUs	South African Universities	3
SCLT	Social Cognitive Learning Theory	31
SLT	Social Learning Theory	31
SMP	Social Media Platforms	58
SMS	Short Messaging Services	16
SPSS	Statistical Package for the Social Sciences	87
STEM	Science Technology Engineering and Mathematics	26
SU	Stellenbosch University	3
TA	Thematic Analysis	39
TCK	Technological Content Knowledge	10
TK	Technological Knowledge	9
TPACK	Technological Pedagogical Content Knowledge	10
TPK	Technological Pedagogical Knowledge	10
Twitter	Think Write Intelligent Thoughtful Topics Evaluate Retweet	13
UCC	University of Cape Coast	34
UCLA	University of California, Los Angeles	28
UCT	University of Cape Town	13
UG	Undergraduate	4
UJ	University of Johannesburg	3

Acronym	Full Name	Page #
UK	United Kingdom	49
UL	University of Limpopo	19
UN	United Nations	8
UNESCO	United Nations Educational, Scientific and Cultural Organisation	8
UNISA	University of South Africa	9
UP	University of Pretoria	3
URL	Uniform Resource Locator	83
USA	United States of America	19
USAf	Universities of South Africa	8
WHO	World Health Organisation	
Wits	Witwatersrand University	1
WSU	Walter Sisulu University	7
WWW	World Wide Web	30
#FMF	#FeesMustFall	11
#RMF	#Rhodes Must Fall	11

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Chapter 1:

Introduction and Rationale

In this chapter, the researcher uses seven research objectives to answer the research question, “What are university students’ perceptions of ERT/L at a South African University”. To understand why this question is important, the researcher will briefly provide some background, starting with a general problem that flows to a specific problem within the Higher Education (HE) sector. Once the specific problem statement is clarified, one will read about three consequences, pinpointing the importance of this research, within the current situation, followed by a solution and one final overview.

1.1 Background

On the 5th of March 2020, the Minister of Health, Dr Zwelini Mkhize announced that the National Institute for Communicable Diseases (NICD) had positively identified South Africa’s (SAs) first Coronavirus Disease-19 (COVID-19) patient (South African Government [SAG], 2020a, March 5). As reported by Pillay-van Wyk et al. (2020), the South African Government (SAG): President, Cyril Ramaphosa urgently responded to the situation by taking proactive measures. During the press statement (SAG, 2020b, March 15), President Ramaphosa said,

“The world is facing a medical emergency far graver than what we have experienced in over a century...Never before in the history of our democracy has our country been confronted with such a severe situation...This situation calls for an extraordinary response” (p. 1).

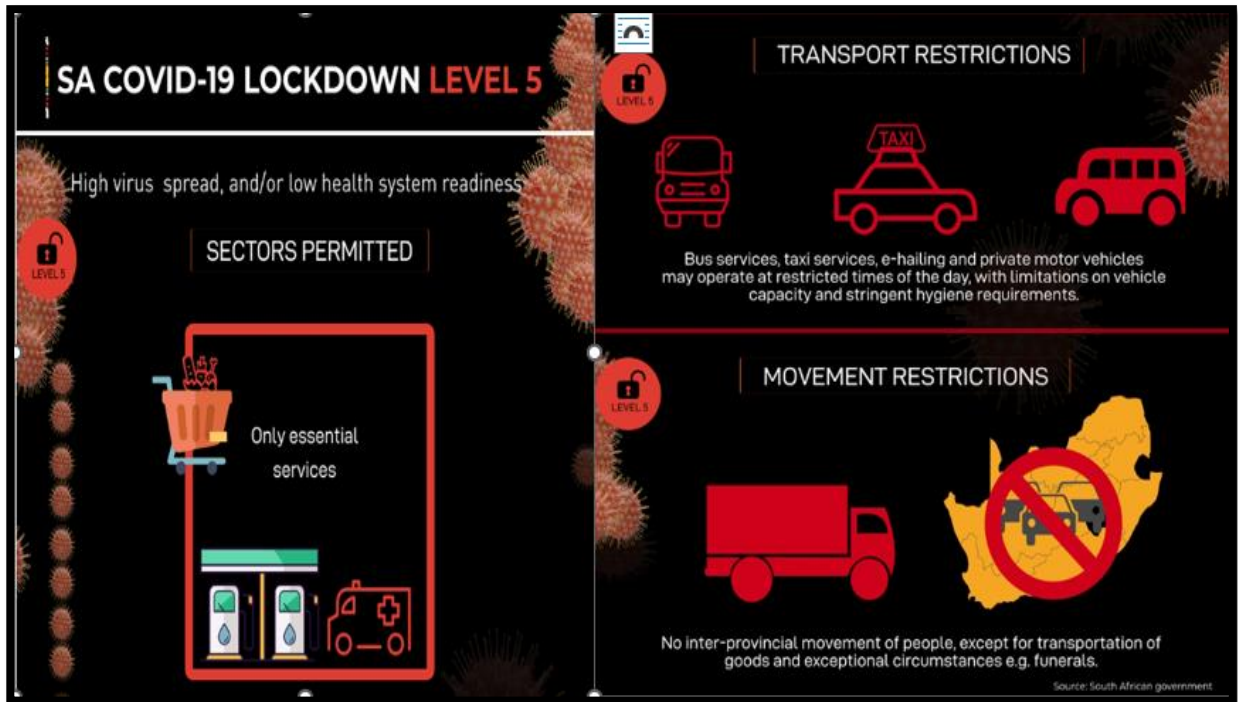
To manage the disease, curb infection rates, reduce the economic and social impact and protect the nation, President Ramaphosa implemented the Disaster Management Act (DMA) No. 57 of 2002 on the 15th of March 2020, along with additional preventative measures with immediate effect (SAG, 2020b, March 15). On the same day, only 10 days after the first COVID-19 positive case in SA, University of Witwatersrand (Wits) informed the public that a student had tested positive for COVID-19 (Wits University, 2020a, March 15). This case had just demonstrated how contagious the virus was.

With the DMA in place, President Ramaphosa (2020, March 15) proclaimed that on legal grounds the government was in the process of assembling a National Coronavirus Command Council (NCCC) spearheaded by the President himself. For the primary purpose of establishing “an integrated and co-ordinated disaster management policy that focuses on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery” (p. 2), aided by disaster management centres and volunteers on a local, provincial, and national level (Disaster Management Act [DMA], 2002). One of the first policies issued by the NCCC materialised when President Ramaphosa addressed the nation on Monday evening, the 23rd of March 2020. The President informed all South Africans of a 21-day national lockdown (lockdown level 5) supported by the DMA, effective from midnight on the 26th of March 2020 (SAG, 2020c, March 23), as depicted below in Figure 1.

This was in response to limiting the spread of the COVID-19 pandemic as declared by the WHO (2020b, March 11). According to the WHO (2020b, March 11), COVID-19 was a new and highly infectious disease that was spreading at an exponential rate with symptoms ranging from mild respiratory illness to severe cases that require hospitalisation, which could result in morbidity and even mortality. The severity of COVID-19 was reported by the NICD (2020, March 26) and showed that on day one of Lockdown Level 5, over 900 South Africans were already infected with COVID-19 (Sibanyani, 2022, June 24).

Figure 1

Lockdown level 5 Infographic



Source: Note. Sibanyani, 2022, June 24

1.2 The Effect of COVID-19 (The General Problem Statement)

From a macro perspective, the pandemic disrupted many dimensions of daily life, including and not limited to human society, the economy, education, healthcare, transport, and service sectors (Khalifa et al., 2021; Kumar et al., 2021). Throughout Lockdown Level 5 (highest alert level), households were restricted to their place of residence unless they worked in the essential service sector, were busy buying essential goods, requesting medical assistance, or collecting a social grant. To save human lives, the NCCC restricted the freedom of movement of people, goods, and services according to different alert (lockdown) levels.

1.3 Higher Education

Based on a Higher Educational (HE) point of view, university life drastically changed worldwide, especially for both lecturers and students in the tertiary industry when educational institutions physically shut down campuses across national and international borders. Crawford et al. (2020) and Sahu (2020) reported that globally, universities ceased all on-campus activity including conferences, graduation ceremonies, workshops, sporting activities and all other campus activities.

Following the DMA and the NCCC, South African Universities (SAUs) announced without delay that contact classes were to be immediately suspended. To mention a few, the University of Pretoria (UP), Wits, University of Johannesburg (UJ) and Stellenbosch University (SU) (Stellenbosch University [SU], 2020, March 17; University of Johannesburg [UJ], 2020, March 24; University of Pretoria [UP], 2020, March 16; Wits University, 2020b, March 15).

1.4 ERT/L (The Specific Problem Statement)

Given the sudden COVID-19 emergency, university students could not attend offline Face-to-Face (F2F) classes/practical's/tutorials/ tests and exams on university grounds as the traditional learning and teaching model became impractical and redundant immediately (Sahu, 2020). To continue with the academic calendar under lockdown regulations, universities adapted the traditional curriculum to enable alternative online modes of instructional delivery, such as Emergency Remote Teaching and Learning (ERT/L) (Hodges et al., 2020; Milman, 2020, March 25; Raheim, 2020). ERT/L is defined according to Hodges et al. (2020) and Raheim (2020) as a

sudden short-term pedagogical shift, due to an emergency or crisis. Milman (2020, March 25) considered the current circumstance a pandemic pedagogy while Ewing and Cooper (2021) associated ERT/L to represent a double-edged sword with two infinite characteristics (enabling learning but limiting effective learning).

1.4.1 ERT/L Complication 1

According to Ewing and Cooper (2021) effective learning is based on the theoretical framework called the Community of Inquiry (CoI), proposed by Garrison et al. (1999). Garrison et al. (1999) stipulated that effective learning is the outcome of social, cognitive, and teaching presences, where lecturers facilitate interactive learning environments and create higher level-thinking students. The main ERT/L limitation is that it allowed students to continue with their academic progress, making use of the cognitive and teaching presences, without merging an interactive online social presence (Ewing & Cooper, 2021; Garrison et al., 1999). The implication thereof produced an online learning environment but not an effective online learning environment.

Darkwa and Antwi (2021) substantiated that classroom learning (offline F2F) is more effective than online ERT/L. Their results showed that interactivity was significantly higher during offline F2F than ERT/L. This was confirmed by Supriya et al. (2021) who reported that 70% of undergraduate (UG) students perceived ERT/L negatively. When the authors looked at why students felt that way, some students described ERT/L as an isolating experience and explained that a lack of student and lecturer interactions made it more difficult to learn the course content.

Nevertheless, Elhadary et al. (2020) asked UG students about their online interactive learning environment during the pandemic (ERT/L) and their outcomes were different to both Darkwa and Antwi (2021) and Supriya et al. (2021). Instead, many students strongly agreed and agreed that ERT/L was similar to offline F2F classes with respect to interactivity. A total of 80.6% of students felt that recorded classes helped immensely with learning the course content. Furthermore, Cranfield et al. (2021) said that UG students preferred to work independently during ERT/L.

Another way to differentiate between learning and effective learning within the pandemic context is to perceive the basic definition of learning as students who can use lower-level thinking skills

such as remembering, understanding, and applying new knowledge (Jacobs et al., 2011). Whereas, Jacobs et al. (2011) denoted that students who have effectively learnt new knowledge are those who can access higher-level thinking skills, such as analysing, evaluating, and creating new knowledge schemes.

Given the above information, some students perceived online ERT/L negatively because their learning environment lacked interactivity (Darkwa & Antwi, 2021; Supriya et al., 2021). Whereas other students perceived the same experience positively and enjoyed the additional online learning features (Elhadary et al., 2020). Either way, Cranfield et al. (2021), Darkwa and Antwi (2021), Elhadary et al. (2020) and Supriya et al. (2021) all agreed on one thing; namely that ERT/L was a new situation and the impact on the tertiary industry remained uncertain. Therefore, based on published academic literature there was a need to understand ERT/L and one way to contribute to that existing gap was to examine SA student perceptions of ERT/L at a traditional university.

1.4.2 ERT/L Complication 2

The second drawback to ERT/L, is that researchers do not know what the effects are when using a pedagogy like ERT/L without an established curriculum framework. Resultantly there was no guarantee that effective learning was taking place during the pandemic because there had not been any research on ERT/L (Crawford et al., 2020; Darkwa & Antwi, 2021; Stewart, 2021; Supriya et al., 2021).

What researchers do know is that curriculum development is pivotal to the process of effective teaching and learning (Jacobs et al., 2011; Khoza & Mpungose, 2020; Makumane, 2021). To contextualise the importance of a curriculum, one should perceive a lecturer's university curriculum as important as a clinical or counselling psychologist's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Without either, both professionals will face many obstacles before effectively teaching or successfully diagnosing a patient correctly. Jacobs et al. (2011) and Akker (2004) explained that lecturers use the universities' curriculum to guide whom to learn, when, how, why, what and where they teach. These core questions form part of what Akker (2004) named the Curricular Spider Web, which consists of 10 curriculum components as seen in Table 1 and Figure 2 below.

Table 1

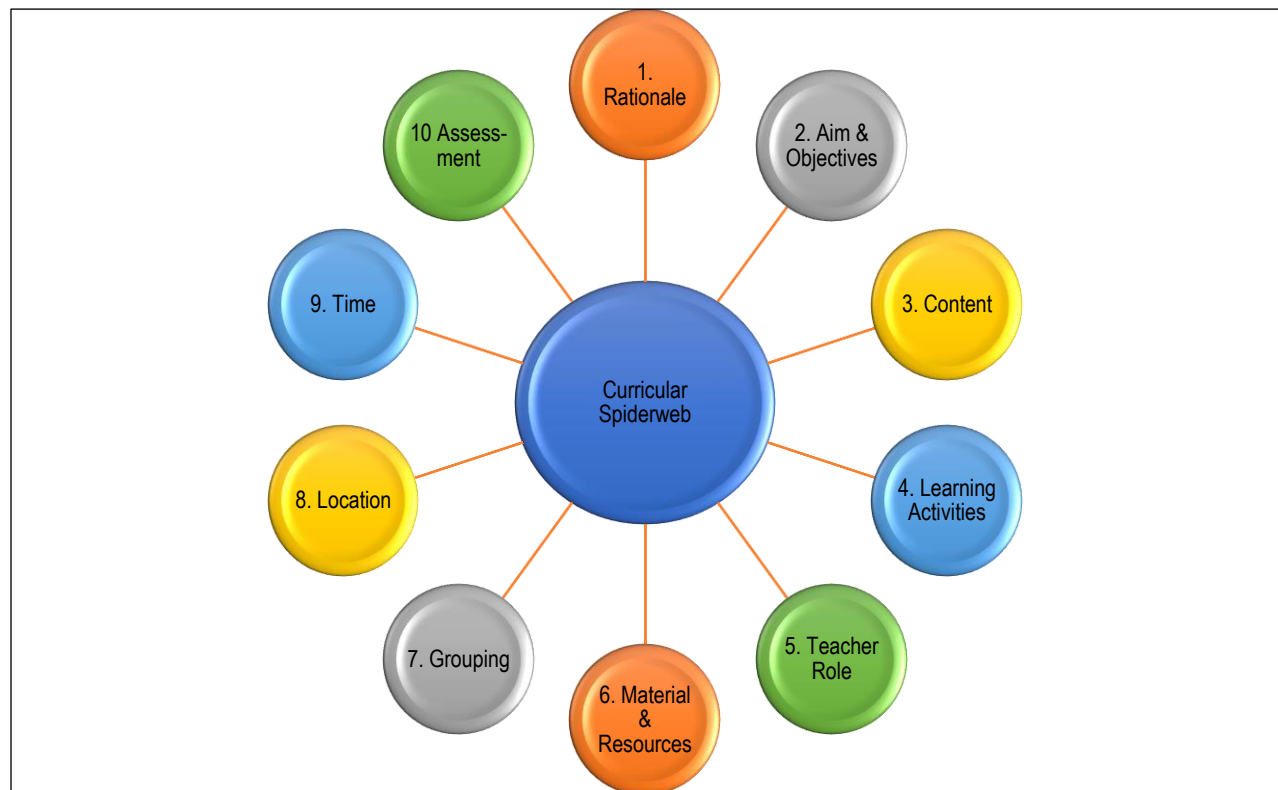
The Curriculum Components in question form

Number of components	Component	Core Question
1	Rationale	Why are they learning?
2	Aim and objectives	Towards which goals are they learning?
3	Content	What are they learning?
4	Learning activities	How are they learning?
5	Teacher role	How is the teacher facilitating their learning?
6	Material and resources	With what are they learning?
7	Grouping	With whom are they learning?
8	Location	Where are they learning?
9	Time	When are they learning?
10	Assessment	How is their learning assessed?

Source: Note. Akker, 2004

Figure 2

The Curricular Spider Web.



Source: Note. Akker, 2004

Referring to Table 1 and Figure 2, the reader will observe that when universities design their curriculums, a professional team of experts carefully assemble and align a sequence of 10 co-dependent concepts that complement one another. These concepts include the flowing, rationale, goals, content, resources, activities, teacher/students' role, location, accessibility, time, and assessment. One can also cognitively picture that when the 10 concepts are configured correctly, they symbolise a strong chain supported by empirical research (Akker, 2004; Thijs & Van Den Akker, 2009). Research showed that the curriculums do contribute to effective teaching and learning (Jacobs et al., 2011), however only if the sequence remains unchanged during the curriculum construction and implementation phase (Akker, 2004; Thijs & Van Den Akker, 2009). Should one concept change, it creates a domino effect and consequently the other nine concepts are affected. The results create a compromised curriculum and like, Thijs and Van Den Akker (2009) said, "every chain is as strong as its weakest link" (p.12). What is important to remember is that curriculum development is a complex process which involves many hours of planning before being institutionally approved (Darkwa & Antwi, 2021).

Practically speaking, ERT/L is a compromised curriculum because the concept location changed from offline F2F learning to online classes. Consequently, researchers do not know what the effect of ERT/L will have on the teaching and learning process. SAUs, like Walter Sisulu University (WSU) explained that they had limited time to plan and implement an approved online curriculum and therefore, they were forced to "scramble to save the academic year" (Songca et al., 2021, p. 42). Czerniewicz et al. (2020) denoted that many SAUs frequently adjusted and condensed their academic curriculums which could also have added to the stressful experience for everyone in the HE sectors. In fact, Meccawy et al. (2021) titled their journal article as, "Teaching and Learning in Survival Mode...during the COVID-19 Lockdown" (p. 1).

Without research on ERT/L, universities and lecturers could not and cannot prepare for future emergencies that might require an abrupt curriculum change. Should there be another global pandemic, universities and lecturers can use ERT/L research to be better prepared and equipped to skilfully handle a curriculum transition. This will demonstrate organisational agility and thereby reduce the negative and isolating experience for student Online Learning (OL) environments (Cooper & Kramers-Olen, 2021; Matarirano et al., 2021; Songca et al., 2021a).

1.4.3 ERT/L Complication 3

At the start of the pandemic, Crawford et al. (2020) decided to contribute to the ERT/L gap by conducting a desktop analysis. Their desktop analysis looked at how Higher Educational Institutions (HEIs) across 20 countries responded to the pandemic, and then compared developed and developing economies. The authors reported that developed HEIs were successfully implementing ERT/L. Unlike developed HEIs, other developing HEIs, like some South African and Nigerian universities, were struggling with the transition because of multiple challenges. Barriers included infrastructure support, staff readiness, student accessibility and implementation procedures (Ali, 2020). Additional challenges included equity concerns (World Bank, 2020, April 8) and quality control as lecturers and students lacked adequate online training skills (MacGregor, 2020 June 4). Equally important, is that the researcher wants to emphasise to the reader that the “forced” ERT/L transition depended on the universities existing infrastructure and available resources to move online during the pandemic. The problem was that the ERT/L transition varied between different SAUs based on university type and location; rural versus urban, old versus new, Historically Advantaged Institutions (HAIs), versus Disadvantaged Institutions (HDIs) and “research-intensive”, “comprehensive” and “universities of technology” (Czerniewicz et al., 2020).

In 2020, the Universities of South Africa (USAf) released a report that documented how prepared all 26 public universities were for the ERT/L transition as from the 6th of May (USAf, 2020, May 6th). This report confirmed the HE learning reality; that eight rural/HDIs were less prepared and faced more challenges to enable an online environment as compared to 18 urban/HAIIs. This comparison highlighted the digital divide between those that had access to tertiary education and those that did not. This is a big problem because the divide contradicts the right to education as stipulated in Chapter 2 of the Bill of Rights, “(1a) Everyone has the right to a basic education, including adult basic education; and (1b) to further education, which the state, through reasonable measures, must make progressively available and accessible” (Chapter 2: Bill of Rights, 1996, p. 12).

Presently, SA researchers have an opportunity to investigate a new global approach to education through the transformation from traditional learning to ERT/L. This method is supported by United Nations Educational, Scientific and Cultural Organisation (UNESCO) (UNESCO, 2020) and is seen as an opportunity by the United Nations (UN) to develop an effective online education

strategy for future global pandemics (UN, 2020). This research can also contribute to The Global Education 2030 Agenda of UNESCO, by leaving no student behind (UNESCO, 2017). Besides, researchers have a professional and ethical responsibility to investigate, explore and understand this new learning ecosystem that is related to COVID-19, especially factors that prohibit access to education and life opportunities.

1.5 The Solution

Despite these adversities, Professor Mpine Makoe, the Director of Open Distance eLearning at the University of South Africa (UNISA) shared her vision for overcoming these challenges. This could be achieved by redirecting the educational landscape (Alliance for African Partnership [AAP], 2020, May 27). On the 27th of May 2020, Professor Makoe emphasised three guiding principles during her webinar that was presented to the Alliance for African Partnership [AAP]:

“First, education is a fundamental human and an enabling right. This human right to education allows people to reach their potential. Secondly, education is a public good, not a commodity. It is something that all of us needs access to. Thirdly, education ensures equitable access to life opportunities” (AAP, rec. 14:44)

Given these ERT/L challenges and opportunities to improve education in SA, this research study would like to investigate students' perceptions related to ERT/L. In other words, student perceptions will be operationalised and measured according to constructs aligned to the TPACK Theory. The goal of this research study is to understand university students' perceptions of ERT/L at a SAU. To achieve the research aim, the research study used the following seven research objectives to assist.

1. To investigate student perceptions of their lecturer's Content Knowledge (CK) during ERT/L
2. To analyse student perceptions of their lecturer's Pedagogical Knowledge (PK) during ERT/L
3. To examine student perceptions of their lecturer's Technological Knowledge (TK) during ERT/L
4. To evaluate student perceptions of their lecturer's Pedagogical Content Knowledge (PCK) during ERT/L

5. To understand student perceptions of their lecturer's Technological Content Knowledge (TCK) during ERT/L
6. To inspect student perceptions of their lecturer's Technological Pedagogical Knowledge (TPK) during ERT/L
7. To review student perceptions regarding the Technological Pedagogical Content Knowledge (TPACK) experience during ERT/L.

1.6 Overview

The reader is now aware of what the research problem is and how ERT/L affects society from both a general point of view (all sectors of society) and a specific perspective (Higher Education sector). This explains why the research question is important and how the research objectives will assist the researcher to answer the research question.

In the following chapters, the researcher will provide additional information as related to the research question. For example, in Chapter 2: The Literature Review, the research question is contextualised, linked to other published academic researched articles, and embedded from the TPACK Theory.

Chapter 3: The Methodology, outlines the research plan, aligning the research question with the descriptive research strategy and survey research design. More importantly, outlining the Ethical Procedures and Standards this research study will follow when conducting research on participants that voluntarily participate in this research study.

From Chapter 4: The Results, the researcher moves from a theoretical perspective to a practical point of view. Summarising, tabulating, and discussing the quantitative and qualitative data collected to answer the research question.

Then finally, Chapter 5: The Discussion, Limitations, Future Recommendations and Conclusions will combine Chapters 2 and 4, synthesising the research results against the backdrop of existing academic literature to answer the research question.

Chapter 2: Literature Review

2.1 Higher Education prior to the Pandemic

In 1961, George Orwell said, "Who understands the past, shapes the future, who understands the past, shapes the present" (Orwell & Fromm, 1961, p.162). Looking back at the history of South Africa's Higher Education (SAHE) system, two specific events stand out. Both retrospective events resonate with the consequences experienced and felt during COVID-19. Firstly, during the 20th century, Strydom (2020) reminded academia of when the Spanish Flu pandemic reached the South African shores in September of 1918. Secondly, one century later, Booyesen (2016) and Langa et al. (2017) documented how SAU student-led movements developed into #RhodesMustFall (#RMF) and #FeesMustFall (#FMF). Students across SAU united to campaign for their constitutional right to educational transformation post-apartheid (SAG, 2017). All three events, the student-led movements, the Spanish Flu pandemic, and COVID-19 affected the entire SAHE community and led to university campus closure.

Fortunately, the difference between then and now is that one century ago, SAU did not have access to technological innovations such as those generated by the industrial revolution. Thereupon, SAU in the 21st century did have some experience with, and access to, Information and Communication Technology (ICT). Consequently, allowing SAU to explore and enhance learning experiences and perceptions related to new learning environments such as resilient blended learning and ERT/L pedagogies.

2.1.1 Spanish Flu Pandemic

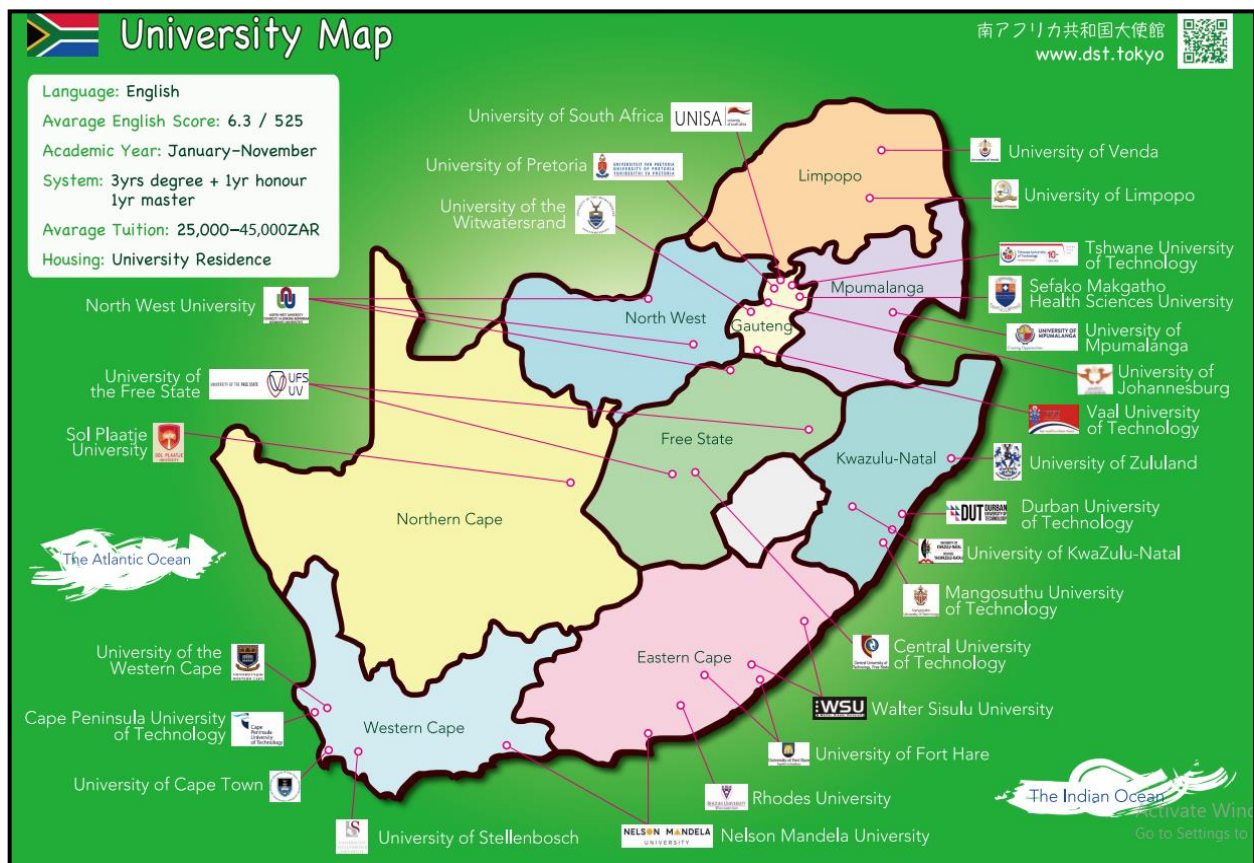
In comparison Nasson (2020) and Strydom (2020) averred that both the Spanish Flu pandemic and COVID-19 impacted HEIs in similar ways. For example, the infection and mortality rates accelerated within days of the first identified patient. Firstly, both pandemics used mandatory Personal Protective Equipment (PPE). Secondly, universities immediately announced the postponement of contact classes indefinitely. The actions taken then and today represent some preventative measures used to fight both pandemics (Robinson, 2021), thereby affecting student and lecturer lives within the HE environment. The difference between the Spanish Flu and COVID-

19 is that the effects of the former had a much shorter life span (Strydom, 2020). However, since the Spanish Flu pandemic and prior to the COVID-19 pandemic, SAU campuses have remained unaffected by life-threatening global pandemics.

2.1.2 Student Protests

Comparable to the consequences of the Spanish and COVID-19 pandemics, student protests also brought about campus closures that affected everyone in the HE community (Hodes, 2017). More recently, the national effects of university students protesting across all nine South African provinces can be seen from a birds eye view, when looking below at Figure 3 (Embassy of the Republic of South Africa Tokyo, 2017).

Figure 3
Universities across South Africa



Source: Note. (Embassy of the Republic of South Africa Tokyo, 2017)

Bosch (2016) and Daniels (2016) substantiated that #RMF and #FMF would always represent two revolutionary student-led campaigns in 2015. Both student-led campaigns demonstrated the power of hashtag politics utilising instantaneous communication, updating, mobilising, and organising university students across university campuses. Bosch (2016), Davis (2013), and Jeffares (2014) defined hashtag politics as applying Think Write Intelligent Thoughtful Topics Evaluate Retweet (Twitter) as a political and collective vehicle of communication, information, and participation. The purpose was to maximise participatory citizenship with digital activism so that the SAG would hear and read about public and marginalised voices. Therefore, to understand how hashtag politics prepared the way for student protests within the HE community, the researcher will briefly describe the university academic calendar between 2015 and 2017.

2.1.2.1 #RhodesMustFall. The first student-led-movement started at the University of Cape Town (UCT) and developed into the #RMF movement on the 9th of March 2015 (Daniels, 2016). The #RMF movement began when UCT student activist Chumani Maxwell threw human excrement at the Cecil John Rhodes statue on campus (Daniels, 2016; Linden, 2017; Meth, 2017). The reasoning behind Maxwell's behaviour was that the statue was a symbolic representation of pre-democracy values in SA, signifying racism and British Colonialism. Led by activist Maxwell, students and staff started toyi-toying together by singing, dancing, and calling on university management to remove the statue. According to student and staff perceptions, the statue was an inappropriate symbol after 21 years of South African democracy. Subsequently, on the 9th of April 2015, the university management concurred to staff and student demands and removed the statue (Linden, 2017).

At the same time, Linden (2017) reported that on the 17th of March 2015, university students from Rhodes University (RU) in the Eastern Cape started questioning the integrity behind the name of their university. Similar to UCT student perceptions, RU students perceived that the university's current name reflected a lack of educational transformation post-democracy. Correspondingly, Meth (2017) said that the students wanted the university to be renamed and to symbolise HE transformation. One month later, Linden (2017) informed the public that the RU management agreed to rename the university sometime in the future.

The success of the #RMF movement, which started at UCT and RU, inspired students from SU to start their campaign, called #OpenStellenBosch (Daniels, 2016; Linden, 2017). Nicolson (2015,

September 7) reported that the primary modus operandi for this campaign was to bring attention to the outdated language policy of the US, highlighting issues of racism and presenting classes in Afrikaans. To contextualise US students and staff lived realities, a video called "Luister" was released and uploaded onto YouTube that documented the day-to-day experiences of 32 students and one lecturer. Consequently, Linden (2017) said that on the 12th of November 2015, the US announced that it would update its teaching language policy.

2.1.2.2 #FeesMustFall. The second major student-led campaign, #FMF, started in Gauteng around mid-October 2015 (Bosch, 2016; Daniels, 2016; Malabela, 2017) . The #FMF movement began just after Wits and UCT announced a 10.5% and 10.3% student tuition fee increase for 2016 (Booyesen, 2016; Booyesen & Bandama, 2016). Poplak (2016, October 4) noted that university fee increases were a consequence of the SAG reducing university funding by 9% over the last 10 years, while the HE inflation rate had increased by approximately 6% per year. Under those circumstances, the only way to make up for the difference was to increase tuition fees for registering students.

In response to the increased tuition fees, Bosch (2016) pointed out that the #FMF movement had generated 1.3 million tweets during the last two weeks of October, just before the November university exams. With the increasing online support for #FMF, students from different universities joined the movement, calling for zero increase in student tuition fees. Students protested in various ways, from marching collectively, barricading university access and locking in university staff on campuses (Malabela, 2017).

The student movement had such an impact that on the 23rd of October 2015, former South African President Jacob Zuma declared that there would be no increase in university fees for 2016 (Booyesen & Bandama, 2016; Linden, 2017). Despite the zero fee increase for 2016, the #FMF student movement moved beyond the initial purpose for all South African university students. Instead, students demanded that universities needed to hire general university workers (cleaning and gardening staff), deracialise university staff and end the rape culture experienced on the campuses. Additionally, students wanted universities to clear student debt, provide free decolonised Afrocentric education, and build proper university student accommodation (Malabela, 2017).

As the initial purpose of the #FMF movement expanded, Meth (2017) averred that peaceful student protests had turned into violent student riots. Kamga (2019) reported that between October 2015 and June 2016, the destruction of university property across SA had accumulated to approximately R500 million. Student protesters even went as far as being lawfully and legally accused of allegedly assaulting a university staff member. Under these increasingly violent circumstances across university campuses, some universities hired private security companies and often called for additional support from the South African Police Services (SAPS). Unfortunately, this continued sporadically during the 2016 and 2017 HE academic calendars.

In the interim, on the 14th of January 2016, former President, Jacob Zuma, initiated a Commission of Inquiry into Higher Education and Training to investigate the feasibility of free education. Towards the end of 2017, two events significantly contributed to resolving student protests across the country. The first was that the Commission announced that they were inclined toward a fee-free HE, as reported on the 13th of November 2017. The second was when former President Jacob Zuma publicly said that selected first-year students would have access to free HE (Kamga, 2019).

2.1.3 Resilient Blended Learning

Czerniewicz et al. (2019) and Tekane et al. (2018) revealed that SAUs intermittently shut down all on-campus activities during the period of 2015 to 2017. On-campus activities included (but were not limited to) F2F classes, tutor classes, library study space, university Wi-Fi access, and computer and practical laboratories (Scheepers et al., 2018).

Tekane et al. (2018) and Potgieter et al. (2019) explained that, given these circumstances, universities had to move to online teaching and learning as a preventative stop-gap measure. Overnight, universities went online, using the "Resilient Blended Learning" (RBL) pedagogy (Czerniewicz et al., 2019). The word resilient was attached to blended learning as a way of referring to the lecturer's resilient ability to adapt to the current situation. RBL is the ability to teach online with technology despite disruption, displacement, and dislocation (Mackey et al., 2012; Tull et al., 2017).

According to Potgieter et al. (2019), lecturers demonstrated resilience during the 2015-2017 student protest movements in three ways. Firstly, lecturers embraced new communication channels using various applications and online platforms. Social media was a perfect communication platform because it was interactive, instant, and effective. Therefore, lecturers could communicate directly or indirectly with their students. Lecturers used Electronic Mail (E-Mail), WhatsApp, or Short Messaging Services (SMS) for direct communication, and class representatives for indirect communication. Class representatives would relay messages to and from the class via the created WhatsApp module groups.

Secondly, Potgieter et al. (2019) averred those lecturers accommodated a wide variety of student needs, using multiple new teaching methods and modes. Fortunately, many universities had existing online Learning Management Software (LMS), such as clickUP, Modular Object-Oriented Dynamic Learning Environment (Moodle), and Blackboard Collaborate (BBC). These platforms facilitated teaching technologies, for example, lecturers embedded and uploaded five to 10-minute YouTube videos, reducing student data costs when accessing the class material online. Additionally, lecturers used narrated PowerPoints (PP) in conjunction with asynchronous and synchronous classes.

Thirdly, lecturers re-strategised their summative and formative assessments accordingly. To replace traditional tests and exams, lecturers incorporated more assignments and projects into the modules. Fortunately, lecturers and students had access to quality-controlled programmes such as Turnitin, which is a software program that reports the number of similarities to existing sources detected on an assignment or project. In addition, lecturers used clickUP and Qualtrics to moderate and randomise online assessments and questions between students.

During student protests, lecturers were characterised as resilient as the implementation of advanced teaching technologies had to meet academic learning objectives. This overall experience accentuated some weaknesses (Czerniewicz et al., 2019; Potgieter et al., 2019; Tekane et al., 2018), as some lecturers liked the BL approach, whereas others did not like it.

One way to comprehend this difference is to realise that various SAUs use the BL approach differently, and therefore lecturers had varied expectations and experiences. de Wet et al. (2018)

explained that lectures from the UJ only slightly adjusted their curricula due to student protests, as BL was already a standardised curriculum pedagogy. Other lecturers from the UP agreed on the success of BL as that they routinely alternated between offline F2F and OL pedagogies (Potgieter et al., 2019). Whereas Czerniewicz et al. (2019) denoted that there are lecturers who were opposed to BL pedagogy and perceive OL tools as gimmicks. As stated by a UCT lecturer, BL is inappropriate for undergraduates since most students struggle with motivation and self-regulation (Czerniewicz et al., 2019). As shown above, the examples underlined some of the issues experienced by most lecturers and students (Czerniewicz et al., 2019; Potgieter et al., 2019; Tekane et al., 2018).

Additionally, many South African students do not have access to the internet and cannot afford to purchase expensive internet bundles. Furthermore, not all registered students or lecturers have privately owned laptops or household computers. Therefore, software, hardware, and internet prices make it harder for students and lecturers. Collectively, these factors widen the digital divide by separating those who have access from those who do not, thus contradicting the primary objective of South African post-democratic education.

To lighten the daily challenges experienced by students, universities set up secure computer laboratories around campuses to help students with limited access (Potgieter et al., 2019). However, considering the challenges mentioned above, it is understandable that BL is not a one size fits all approach. This BL characteristic may explain why the BL pedagogy remains ambiguous and undefined within the academic literature.

2.1.3 Blended Learning

One can conceptualise BL as a unique teaching recipe (van der Merwe et al., 2015) made with two ingredients, offline F2F learning and OL pedagogies. Depending on the situation (learning environment), Potgieter et al. (2019) averred that lecturers customise the ingredient ratios to align their teaching approach (pedagogy) to optimise student needs and achieve the desired academic outcomes. Czerniewicz et al. (2019) and Tekane et al. (2018) described how lecturers increased OL and reduced offline F2F learning during peak violent student riots. Alternatively, when student protests are less destructive and more peaceful, lecturers have the freedom to rotate the learning modes proportionately. Czerniewicz et al. (2019) and Tekane et al. (2018) explained that, in either OL or equal (offline F2F and OL) dominant contexts, the university goals remained the same. The

main university objective has always been about accommodating student educational needs, despite the student disruptions caused throughout the negotiations of demand and conflict resolutions. Emanating from the BL construct, Twigg (2003) conceptualised BL into four structures: Replacement, Supplemental, Emporium, and Buffet.

2.1.3.1 Replacement. The replacement quadrant of BL is an example of the RBL scenario that previously took place across SAUs. For instance, OL became the dominant learning mode, while offline F2F learning was limited (Twigg, 2003). Looking at both the #RMF and #FMF student campaigns, SAU implemented the replacement model, drastically reducing offline F2F learning on campus (Czerniewicz et al., 2019; Potgieter et al., 2019; Tekane et al., 2018). For example, de Wet et al. (2018) explained via a PP that lecturers from the UJ only slightly adjusted their BL academic curriculums due to implementing the BL curriculum in 2015. To clarify, UJ staff, students, and lecturers were already familiar with BL pedagogy strategies before the student protests (de Wet et al., 2018).

2.1.3.2 Supplemental. The second BL quadrant is called supplemental. As the name implies, offline F2F is the dominant learning method, and OL is supplementary to traditional learning (Twigg, 2003). Potgieter et al. (2019) pointed out that in 2014, the UP adopted a hybrid teaching and learning pedagogy, otherwise known as BL - before and after the student protests, the standard teaching pedagogy at UP was the supplementary form of BL. On the other hand, SU only recently stated its participation by rolling out a five-year BL plan that started in 2019 (van der Merwe & Schoonwinkel, 2020). Using the LMS, Potgieter and Harding (2022 February 28) revealed that lecturers could use various learning resources such as BL to facilitate 21st century learning and teaching.

2.1.3.3 Emporium. The emporium quadrant of BL is slightly different from the other three quadrants (Replacement, Supplemental, and Buffet). The main difference is that this quadrant does not offer offline F2F learning. The core principle is that students learn whilst interacting with the material instead of listening to someone presenting it to them (Twigg, 2003). To illustrate, students attend classes OL using university facilities, such as computer labs or personal computers on campus or at home. In either situation, Twigg (2003) described this quadrant of BL as when students learn content "using interactive computer software combined with personalised, on-demand assistance" (p. 26).

Mr Hopi Mboweni from the University of Limpopo (UL) strongly endorsed the Emporium form of BL (USAf, 2019, May 10). LMS, like BBC, gives lecturers the tools to move their teaching, testing, formative, and summative assessments online. According to Mr Mboweni, his students do not need him physically in the classroom. Instead, his students need a stable internet connection, wider bandwidth, and efficient LMS to master 21st century skills. Based on Mr Mboweni's student perspectives, they described him as someone who embraces 21st century thinking and teaching. As a reminder of his teaching philosophy, his students said, that they will always be lifelong learners with a self-directed learning attitude (USAf, 2019, May 10) because of him.

2.1.3.4 Buffet. The last quadrant of BL is the Buffet model, which offers students a personalised combination of offline F2F and OL experiences. Like the Emporium model, OL refers to online learning activities where students decide on what pedagogy ratio (offline F2F and OL) they need to reach their learning outcomes. The difference between the Buffet and Emporium quadrants is that students can choose offline F2F learning according to their individual needs.

The buffet quadrant of BL is about providing university students with alternative ways of reaching the same outcome. To demonstrate, the Arizona State University (ASU) in the United States of America (USA) brings tangibility to the Buffet quadrant of BL. The ASU offers students the option to either register for an offline F2F or a fully OL program. In either learning environment, students use an aligned curriculum that converges when both cohorts complete the same module (Supriya et al., 2021)

To summarise the BL concept, it should be assimilated into an ever-evolving hermeneutic loop (Willig, 2013). All in all, the BL ratioed ingredients (offline F2F and OL) only become tangible (concrete) within a particular context and at a specific time. The critical point is that the definition of BL is time- and context-dependent. For example, how SAUs defined BL differences from prior COVID-19, during COVID-19, and post-COVID-19 and changes from one SAU to another.

Since then, SAUs have developed and researched many other online BL methods, modes, and pedagogies. Elhadary et al. (2020) said that in SA, e-Learning could include BL, as previously discussed, in addition to mobile education, synchronous, and asynchronous learning. For

instance, BL involves offline F2F learning in class and accessing e-Learning tools simultaneously. In contrast, mobile educational learning takes place anywhere, at any time, and when students use their electronic devices for educational content.

Synchronous learning occurs when the lecturer and students concurrently use e-Learning tools, such as attending a scheduled online class (Elhadary et al., 2020). In comparison, asynchronous learning limits OL interaction as students watch recorded classes or read and listen to narrated PP slides.

Butucha (2020) explained that all these different e-Learning modes share common characteristics. Firstly, university students voluntarily registered, knowing the primary pedagogy approach of the university as stated in their curriculum (offline F2F, BL, OL). Secondly, the e-Learning pedagogy has full faculty support and long-term educational objectives. For example, when students look at their university study guide, they know what is expected of them based on the module objectives and outcomes. Therefore, it is pivotal to understand that ERT/L is nothing like the above, as students and lecturers did not have a choice in the matter.

2.2 Higher Education during the Pandemic

When UNESCO Director General Audrey Azoulay announced the inauguration of the global educational coalition in response to the COVID-19 pandemic crisis (UNESCO, 2020b, March 26), people across the world realised the seriousness of the situation when she said, "Never before have we witnessed educational disruption on such a large scale" (para one.). As UNESCO (2020b, March 26) reported, COVID-19 has affected the academic calendar globally. As a result, institutions like schools and universities have closed their doors and sent students home to self-quarantine with their immediate families. This new learning approach was entirely different from previously designed e-Learning pedagogies.

The pandemic crisis has resulted in the largest ERT/L experiment worldwide and as a result, the COVID-19 experience could provide valuable insight into various factors that facilitate the comprehensive evaluation of the pandemic from developed and developing countries. UNESCO Director-General Audrey Azoulay explained (UNESCO, 2020a, March 10), "We are entering

uncharted territory and working with counties to find hi-tech, low tech and no-tech solutions to ensure the continuity of learning" (quote 1.). This statement highlights two things; how complicated the situation is and what the goal is. At the same time the reader will see that the pandemic's complex characteristic is similar to the BL environment, as no single solution will work for every country, situation or university.

Nevertheless, first and third-world nations are asking similar research questions and producing heterogenous and homogenous results. A report by Stewart (2021) provided a global overview of HE literature published during the pandemic. Stewart (2021) summarised worldwide research into four overarching themes using a thematic review. The first theme included diverse ERT experiences, and the second looked at the digital divide and vast educational/socio-economic inequalities. The third theme introduced commonly experienced ERT problems, issues, and challenges, and the fourth theme revealed frequent adjustments in response to ERT. As such, the first two themes demonstrated how varied HE outcomes are (producing heterogeneous results). In contrast, the last two categories showed how similar HE outcomes could be (generating homogenous results).

Part of the research dilemma is that quantitative validity threats and qualitative interpretations saturate academic literature. This statement is not intended to criticise existing literature but rather to bring awareness to existing threats that all research studies experience (Christensen et al., 2015; Gravetter & Forzano, 2018; Shadish et al., 2001). To express this differently, these existing threats contribute to the problem of research validity and trustworthiness, bringing attention to the fact that no research study is flawless. According to Shadish et al. (2001), research validity is an estimated truth based on empirical evidence. Qualitative trustworthiness is seen through the researcher's actions to ensure participant reflections and interpretations (Willig, 2013).

The second part of the dilemma is that researchers operationalise their explanatory variables differently and then measure their response variables differently from one study to the next. For instance, research studies cannot be generalised to one another on account of having different operationalised and measured variables. Consequently, this makes it harder for everyone in the HE community to learn from one another and adjust smoothly to the current pandemic.

The third part of the challenge is that the pandemic has affected every aspect of human life. Especially the way HEIs have responded globally, using what has now become known as ERT/L. When it comes to ERT/L, one needs to remember two essential characteristics. Firstly, one must differentiate between ERT/L and structured e-Learning methods (Hodges et al., 2020). To recap, e-Learning is the product of the developmental trends in ICT, whereas ERT/L is the primary solution to the existence of HEI during a pandemic.

Secondly, Shisley (2020) noted that ERT/L lacks adequate planning, training, and quality assurance compared to traditional or e-Learning methods. Therefore, Williamson et al. (2020) urgently made the following statement, "We want to issue a call for future research to examine, in up-close detail, the effects and consequences expansion and embedding of digital technologies and media in education systems, institutions and practices across the world" (p. 107).

In response to the statement made by Williamson et al. (2020), the best way to examine a new phenomenon like COVID-19 is to carry out a literature review on the topic (Christensen et al., 2014) before conducting a research project. As Gravetter and Forzano (2018) denoted, a literature review has two purposes. The first purpose is to outline the research boundaries, demarcating published research and unpublished work so that the researcher can identify academic gaps within the current literature. The second goal of a literature review is to provide the researcher with a starting point for their research study, strengthening the rationale for the research project.

Given these points, the researcher will review relevant research aligned to ERT/L within the HE community. To summarise, the literature review has three main sections. The first section analysed HE before the pandemic, covering topics such as the Spanish Flu of 1918 and RBL in response to South African students' protests.

The second part of the literature review will investigate HE during the pandemic, covering a variety of studies that share heterogeneous and homogenous patterns. The researcher will take into account developed, developing, and comparative research articles to ensure a comprehensive outlook. For example, the researcher will examine what developed and developing countries have

published on ERT/L, focusing on central psychological constructs and results. Underpinning the similarities and differences between developed and developing worldviews across more than one researched article. The researcher will then analyse student perceptions from a comparative point of view based on an exploratory research design; Contextualising ERT/L and student perceptions globally and then situating SA and African student perceptions. Thereafter, the researcher will focus on South African and African student perceptions.

Lastly, the third section will provide a detailed summary of the literature review by synthesising and integrating the first section (before ERT/L) and the second section (during ERT/L), as presented in Table 2: The Quadrant Map Literature Review Conclusion on (p. 54), before moving on to the theoretical departure point and methodological sections of the research report.

2.2.1 ERT/L in Developed Countries

Two trends stand out about developed ERT/L research articles. The first is that academic grades, and two, that performance plays a pivoting role given that these concepts contribute to how educational institutions are described, measured, and ranked worldwide. Knowing this, it should not be surprising that universities across the USA have invested many research hours examining the relationship between ERT/L and academic performance. By way of illustration, Bawa (2020) and Supriya et al. (2021) decided to investigate the relationship between ERT/L and academic performance since there was a lack of research that could explain the effects of this relationship during a pandemic. Practically, these authors identified existing gaps that could substantiate their research proposal, outlining evidence of the usefulness and purpose of doing a literature review (Christensen et al., 2015).

COVID-19 is a new situation, and as stipulated by UNESCO (2020a, March 10), the current academic literature lacks sufficient empirical, evidence-based research related to all aspects of ERT/L. The problem is that educational institutions do not know the effects on academic performance or student success during these turbulent times (Bawa, 2020; Supriya et al., 2021). However, as Burgess and Sievertsen (2020) explained, ERT/L is not a short-term issue. Instead, the global situation will have long-term consequences that are not entirely understood or fully manifested.

Alternatively, Supriya et al. (2021) described the current context as a unique research opportunity for developed countries, providing insight into student academic grades and ERT/L perceptions. Additionally, African and South African researchers agree that ERT/L is a COVID-19 educational benefit (Makumane, 2021; Matarirano et al., 2021; Songca et al., 2021a). The advantage is that the shift immediately forced traditional institutions and organisations to adopt new and emerging educational curriculums. Songca et al. (2021) described the educational experience as "one of the few silver linings of the pandemic in our context " (p. 56).

2.2.1.1 Learning in the age of SARS-COV-2. Given this opportunity, Bawa (2020) used a quantitative research approach to answer the following research question, "What effect does current ERT measures to deal with the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic have on learners and their performances" (p. 1). Bawa (2020) collected quantitative data from 397 UG students registered at a large college in the Midwest region of the USA. The paired and independent t-Test analyses showed that the outcomes remained the same within and between experimental groups. Statistically, this means that the null hypothesis was not rejected at a 95% confidence level with an alpha level of 5%. In layman's terms, ERT/L did not affect student academic grades negatively.

To understand the quantitative results, the researchers collected additional qualitative data from four research participants, including four professors from various modules: Business, English, Computer Programming and Communication. Notably, Bawa (2020) sampled the four professors given that they had access to information regarding student ERT/L experiences and perceptions. The qualitative data was then collected using written segments from online discussion forms and personal communications between the faculty and registered students (Bawa, 2020).

The qualitative analysis revealed two significant findings. The first part provided insight into the overall student experience, whereas the second focused on student perceptions of teaching strategies. According to the qualitative analysis, the first part revealed 17 categories, whereas the second part produced six themes. The first and second coded themes revealed two overarching themes: positive and negative student experiences.

Although the ERT/L transition did not affect students' academic grades, many students described their experience as negative. The first qualitative part produced 559 negative remarks compared to 288 positive comments, capturing the overall student experience. Negative comments included the following: unexpected increased time spent online, difficulties mastering online course materials and learning in a less structured environment. Despite these challenges, students acknowledged that increased responsibilities and more time for coursework were beneficial. Additionally, students described the ERT/L experience as surprisingly better and enjoyed the flexibility offered by ERT/L. Perhaps academic performance remained the same because the new challenges (positive and negative experiences) balanced the outcome.

The second qualitative part, regarding student perceptions of teaching strategies, produced 472 negative statements compared to 373 positive comments. Positive student perceptions included clear communication and ease of student-teacher interactions. However, negative teaching perceptions dominated the positive teaching perceptions. Negative teaching perceptions included a lack of empathy and sympathy, group work problems, different time zone issues and the unfair grading system.

2.2.1.2 Impact of COVID-19 on Student Learning. Correspondingly, Supriya et al. (2021) also examined academic performance and ERT/L experiences and perceptions in addition to using a quantitative research approach to answer the research questions. Supriya et al. (2021) decided to compare Spring 2020, 2019, and 2018 course grades and collect survey information from instructors and students who had experienced ERT/L during the Spring of 2020. Supriya et al. (2021) decided to investigate these critical constructs because the biology programme offered at ASU could provide a unique perspective.

The researchers had access to possible research participants who were simultaneously either registered for the offline F2F (traditional) or online Biology classes. The offline F2F and online curriculums also shared the same educational objectives and outcomes. For that reason, the researchers could investigate academic grades using experimental designs that compared offline F2F grades in 2020, 2019 and 2018 or online grades between 2020, 2019 and 2018 and then compared the offline F2F and online grades for 2020.

In addition to that, the authors had access to a large cohort of volunteer research participants with diverse backgrounds. This provided the researchers with a representative sample of university students, thereby reducing sampling bias and increasing the study's generalisability. Generalisability means that the results of the study apply to more diverse populations, such as marginalised identities (Christensen et al., 2015). With a higher external validity, the researchers added a second dimension to their research objectives, i.e., comparing marginalised identities to mainstream identities across each research question. For instance, the authors defined marginalised identities as underrepresented Science Technology Engineering and Mathematics (STEM) students, like people of colour or women, compared to mainstream identities, including white men with high socioeconomic statuses.

When Supriya et al. (2021) compared module grades between the offline F2F cohort of 2020 who had experienced ERT/L to previous offline F2F cohorts who had not experienced ERT/L, student grades increased with the offline F2F cohort of 2020 who had experienced ERT/L. The researchers then compared ERT/L academic grades between two different cohort groups within the same 2020 year, i.e., those registered for the F2F and online programme. The analysis showed that ERT/L academic grades were not significantly different as compared to the F2F and online modules. That is to say that the second analysis (students in 2020) confirmed the first outcome (students in 2020, 2019 and 2018).

Aligned to grade comparisons, the regression model tested for negative interactions between demographic groups (mainstream versus marginalised social identities) and revealed no significant interactions between the demographic variables. This meant that there was no difference between mainstream and marginalised academic grades.

Three main similarities are evident when comparing this research study (Supriya et al., 2021) to the previous one (Bawa, 2020):

1. The authors investigated homogenous psychological constructs such as academic performance and student ERT/L experiences and perceptions.
2. They used the same quantitative approach, which shaped their research process.
3. Both quantitative studies included additional qualitative insight.

To demonstrate, Supriya et al. (2021) used a mixture of closed and open-ended questions that were distributed and completed by 501 F2F Biology program students. The difference is that Supriya et al. (2021) noticed an increase in academic performance, whereas Bawa (2020) said that academic performance remained the same. Similar to what Bawa (2020) reported, Supriya et al. (2021) explained that 70% of students described their experience as negative, as opposed to 30% that described the experience positively. The top five negative reasons were a lack of comprehending the online material, fewer interactions, losing focus, being less motivated and overwhelmed by the workload. In contrast, the top positive reasons included: re-watching recorded lectures, having extra time, learning at their own pace, actively engaging with the online material, and feeling more comfortable learning from home.

Additionally, 67% of students who described their experience as negative agreed that it could be associated with not feeling part of the biology community offered at the university. Furthermore, this was confirmed when most students agreed that ERT/L significantly decreased their interactions with peers and lecturers.

2.2.1.3 Student Perspectives. Building on the research published by Bawa (2020) and Supriya et al. (2021), the research conducted by Ramachandran and Rodriguez (2020) contributed to filling in the academic literature gap related to ERT/L from a developed perspective. All three research studies (Bawa, 2020; Ramachandran & Rodriguez, 2020; Supriya et al., 2021) used the same quantitative research approach to answer each research question. The distinguishing feature was that the surveys used to collect the information asked similar, yet distinct questions associated with the same experience. Therefore, each research study contributed to ERT/L experiences and perceptions.

Bawa (2020) analysed the collected survey results using a paired and independent t-test, inferring that academic performance was not affected by ERT/L. However, qualitative results showed that ERT/L influenced student experiences and perceptions negatively. Supriya et al. (2021) examined an additional dimension (social identities) to further academic performance and experiences. Focusing on equivalent constructs and data collecting instruments, Ramachandran and Rodriguez (2020) decided to incorporate a longitudinal element into their survey. For this reason, students completed two surveys on course components and ERT/L challenges experienced.

According to Ramachandran and Rodriguez (2020), academic literature lacks ERT/L teaching strategies and student challenges. To address this, these research authors decided to contribute to the identified research gap by examining and contributing to empirical evidence-based research. Focused on that research goal, Ramachandran and Rodriguez (2020) sampled 602 UG chemistry students from the University of California, Los Angeles (UCLA). Of the 602 registered students, 457 chemistry students completed the pre-course survey, and 432 chemistry students completed the mid-course survey.

The first survey asked students about course structure and remote capabilities. The results obtained by the first survey indicated that most students had prior experience accessing Zoom, Gradescope, and Moodle platforms. The advantage was that 90% of students agreed that online videos explaining content would help them understand the course content better. Students also said that pre-class and post-class assignments would improve content comprehension. The ERT/L drawback was that 69% of students said that they did not have a designated area that was quiet for classes or exams. Furthermore, 30% of students were working to support their families financially. Those who did not have part-time jobs explained that they had other family responsibilities like caregiving to elders and younger siblings, reducing their study time.

The university administration teams and lecturers immediately used the first survey data to personalise and update the existing university curriculum according to students' ERT/L needs and capabilities. To instance, the lecturer scheduled online classes via the Zoom platform and recorded and uploaded online classes onto the Moodle LMS so that students could access and watch the recordings later. At the same time, lecturers uploaded content slides before scheduled synchronous classes and distributed weekly homework assignments via the Moodle platform.

Halfway through the chemistry module, students completed the second survey. The second survey captured student perspectives on course activities, beneficial resources, adjusted assignments, tests and exams, and ERT/L challenges experienced. The second survey results confirmed that homework assignments, activity-based discussions, recorded classes and attending synchronous scheduled classes contributed to student learning. However, the students explained in the qualitative part that weekly quizzes had a negative emotional impact, thus students were always anxious and worried about missing the deadline.

The quantitative challenges students experienced were problems with remaining focused, surrounded by daily distractions and technological issues. The qualitative findings produced five themes, capturing student experiences related to specific challenges. The themes included a lack of focus/motivation, living/financial situations, technology/network issues, anxiety/mental health, and different time zones.

When comparing the three research studies collectively, it becomes apparent that there are student challenges that lecturers cannot control within the learning environment. These include learning in a less organised space, listening and learning without a designated area that is quiet, added responsibilities such as helping with daily household chores, caregiving duties, and financially supporting families (Bawa, 2020; Ramachandran & Rodriguez, 2020; Supriya et al., 2021). However, there are factors that lecturers and instructors can control within a learning environment, to reduce the impact of negative student challenges experienced and perceived during ERT/L.

2.2.1.4 Teaching with Social Media Platforms. Greenhow and Galvin (2020a) from Michigan State University (MSU) in the USA explained that social media could positively moderate the relationship between ERT/L and negative student experiences/perceptions. Other authors with a similar view were Greenhow, Galvin, et al. (2019a), Greenhow, Gleason, et al. (2019b) and Greenhow, Li, et al. (2019c).

According to Christensen et al. (2015), a researcher requires a third variable that can reduce the strength between two related variables to moderate a relationship positively. The explanatory variable is ERT/L which influences the response variable, i.e., negative student experiences/perceptions. One way to alter this relationship between the explanatory and response variable is to introduce a third variable, a moderating variable, that either increases or decreases the strength between these two variables. Lecturers can, for example, use the social media variable to moderate the strength between ERT/L and negative student experiences/perceptions. Consequently, lecturers can control some factors within a learning environment by using the benefits of social media to overcome negative student experiences and perceptions during ERT/L.

Social media is when people access the World Wide Web (WWW), via internet-connected applications such as Facebook (FB), Twitter, and Instagram. These applications allow people to create, share and co-author knowledge generation (Greenhow & Galvin, 2020; Greenhow, Galvin, et al., 2019a; Greenhow, Gleason, et al., 2019b; Greenhow, Li, et al., 2019c). The popularity of social media is because people are perceived as equally important to the information they upload, tag, share or create online. Their online activity contributes to their unique online identity, which is expressed in multiple ways, for example, text, images, videos, likes and shares. While constructing their online identities, users can connect to others with similar interests, likes or hobbies (Greenhow & Galvin, 2020; Greenhow, Galvin, et al., 2019a; Greenhow, Gleason, et al., 2019b; Greenhow, Li, et al., 2019c).

Specifically, "social media, with its affordances for personal profiling, relationship building and content creation when thoughtfully integrated into an online education plan, can help make remote learning seem less remote" (Greenhow & Galvin, 2020, p.514). An article published by Greenhow and Galvin (2020) explained how lecturers could positively moderate the relationship between ERT/L and negative student experiences/perceptions.

Before elaborating on these three positive moderating strategies, it could help the reader and lecturers to understand these strategies from an asset-based approach. The reason is that the approach substantiates the three strategies. In doing that, the strategies explain the final concept associated with the approach, asset mobilisation within an educational setting. Ferreira and Ebersöhn (2012) defined asset mobilisation as using existing and unused assets to reach educational objectives. To put this differently, the asset-based approach and the three strategies bi-directionally complement one another by grounding theory with empirical examples.

2.2.1.4.1 Asset-based Approach. Ferreira and Ebersöhn (2012) explained that the asset-based approach is the antonym of the needs-based approach. Comparably, the needs-based approach is associated with the half-empty glass metaphor regarding perception and perspective. By contrast, the asset-based approach is about perceiving a situation using the half-full glass metaphor. In the asset-based approach, lecturers can use quadrant mapping or asset mapping to identify used and unused resources and assets available in a particular situation. The quadrant map can be drawn using an A4 piece of paper and dividing the paper into four separate quadrants

(Ferreira & Ebersöhn, 2012). Quadrant one is defined by row one and column one, and quadrant two is marked by row one and column two. One row down, quadrant three is limited to row two and column one. Then lastly, quadrant four marks row two and column two. The first and second quadrants list individual and environmental assets contributing to asset mobilisation. When the third and fourth quadrants take note of associated individual and environmental risks that prohibit the process of asset mobilisation.

Using a brief background on asset mapping and asset mobilisation, the researcher will elaborate on the three positive moderating strategies. The following section will demonstrate why and how these strategies fall within the first and second quadrants of the asset-based approach.

2.2.1.4.2 Strategy 1. Greenhow and Galvin (2020) advised lecturers to use multiple forms of communication to connect to their students. Instead of having only formal ways of communicating with students, lecturers can use informal ways of communicating too. Traditional communications include existing forms of communications, such as university emails and university online learning management software, like Moodle and clickUP. At the same time, informal communications include new forms of communication, such as popular student media platforms. Both forms of communication illustrate two protective environmental resources (quadrant two). Where formal communications are an existing environmental asset, and informal communications are a new environmental asset. The newly identified asset is an example of using a current resource that has not been used within a learning context.

2.2.1.4.3 Strategy 2. The second recommendation by Greenhow and Galvin (2020) included that lecturers should actively encourage virtual relationships using social media platforms. Lecturers do this when they embrace informal virtual connections with their students. Theoretically, lecturers would have learned about the Social Learning Theory (SLT) and the Social Cognitive Learning Theory (SCLT). Simplistically, either theory explains that students learn by observation, imitation, and modelling (Nabavi, 2012). Nabavi (2012) demonstrated that behavioural change is highly likely when lecturers combine how students learn with regular encouragement and positive reinforcement. Lecturers model the behavioural change themselves, such as promoting online relationships between students, lecturers and the university, and actively encouraging students to follow them, others, and the university online socially. As

students engage socially, they have access to additional online educational resources that have been liked or shared by their lecturer.

In the same way, students see which other professional organisations and university staff are relevant to their modules. Herewith online relationships are understood as student-to-student relationships, student-to-lecturer relationships, and student-to-university relationships. Based on an increased online network, lecturers can categorise this strategy as a person protective resource labelled in quadrant one of the asset-based approach.

2.2.1.4.4 Strategy 3. The final suggestion by Greenhow and Galvin (2020) was that lecturers align subject content to student experiences with strategies one and two in place. When strategy one and two are in place, social media platforms virtually connect universities, lecturers, and students, forming an online community, thereby demonstrating the person and environmental protective resources in quadrants one and two. The primary reason is that both are required to execute strategy three, although this explains what is needed but not why it is required. To answer the question regarding why both protective assets are necessary to understand students' lived perceptions and experiences from an etic and emic perspective: Christensen et al. (2015) said that an "outsiders' perspective" (p.373) is an etic point of view while an emic perspective is an "insiders' perspective" (p. 373). Thereupon lecturers can get to know their students by observing their online activity (etic perspective) and actively engaging online with their students (emic perspective).

Both perspectives provide essential information that lecturers can use to bridge the gap between subject content and what students find meaningful. Lecturers can tailor the learning objectives in such a way that it reflects what students experience and perceive at the time. Ellison et al. (2007) described that when lecturers do this, crystalised online relationships form because students feel valued by their lecturers and universities.

Should lecturers decide to incorporate these three positive moderating strategies, Krutka, Heath, et al. (2019) and Krutka, Manca, et al. (2019) pointed out the value of using an online educational guide. An online academic guide supports lecturers using social media in the classroom.

Lecturers should use this guide because social media is an entirely new dimension to education, for example moving from offline F2F to OL, where every situation has different advantages and drawbacks. The benefit of OL is the three positive moderating strategies, however, Christensen et al. (2015) demonstrated that an informed decision weighs the cost of doing something compared to its benefit.

To understand the costs of using social media in the classroom, Krutka, Heath, et al. (2019) and Krutka, Manca, et al. (2019) write about principles lecturers could use to overcome some disadvantages. Like quadrant mapping for identifying the person and environmental protective resources, lecturers can now use the same asset map. The difference is that lecturers will now focus on potential individual and environmental risks related to social media use.

From an asset-based approach, the individual risk of using social media in the classroom could be when lecturers assume that all students understand the norms of using social media. At the same time, cyberbullying could be an environmental risk of using social media in the classroom.

When lecturers want to reduce social media costs, they should establish a transparent classroom climate through a collaborative online rule book. As seen in Krutka, Heath, et al. (2019), lecturers should start class by informing their students of all the advantages and disadvantages of using social media in the classroom. Equally important is that lecturers establish a collaborative online rule book, where students create the online rule book when learning with social media platforms. Therefore, should new risks emerge based on quadrant mapping, lecturers could benefit from an online educational guide for using social media in the classroom (Greenhow & Galvin, 2020; Krutka, Heath, et al., 2019; Krutka, Manca, et al., 2019).

2.2.2 ERT/L in Developing Countries

The research will now evaluate ERT/L from a developing point of view, as previously, the research looked at ERT/L from a developed perspective. As the research focus shifts, two critical issues must be emphasised again at this research stage. The first is that ERT/L became necessary overnight (Darkwa & Antwi, 2021; Hodges et al., 2020). Secondly, the ERT/L necessity could not be implemented simultaneously at all HEI across developed and developing countries (Crawford et al., 2020; MacGregor, 2020 June 4). There are multiple reasons for this, but Kopp et al. (2019)

briefly listed five obstacles that prevent a smooth transition to ERT/L, namely technology, change, pace, finance, and competencies, as emphasised throughout the literature review.

2.2.2.1 From the Classroom to Online. A research study by Darkwa and Antwi (2021) from the University of Cape Coast (UCC), Ghana, asked the following two research questions. The first research question used primary data to compare the difference between offline F2F classroom learning and ERT/L based on classroom effectiveness. The second research question used secondary data to analyse offline F2F academic performance and ERT/L academic performance. The operationalised primary data used the same constructs and measurement techniques as outlined by the Directorate of Academic Planning and Quality Assurance (DAPQA) of the UCC. The DAPQA measured classroom effectiveness at the end of each module of each semester. Operationalising classroom effectiveness based on five variables: course content, pedagogical approaches, lesson interactivity, assessment, feedback, and evaluation.

At the end of each semester, university students answered a closed-ended web-based survey anchored on a five-point Likert scale. The five-point Likert scale included the following options, strongly disagree, disagree, neutral, agree, and strongly agree. The secondary data combined classroom assessment and the final exam assessment for two modules registered in the first and second semesters. That is to say that Darkwa and Antwi (2021) sampled the 2^d year UG registered for accounting and education modules from two different faculties.

What stood out is that when Darkwa and Antwi (2021) compared offline F2F classroom effectiveness to ERT/L effectiveness, the results were statistically significant. Specifically, each individual construct (course content, pedagogical approaches, lesson interactivity, assessment, feedback, and evaluation) produced statistical significance. To use one example, the offline F2F assessment was statistically different as compared to the ERT/L assessment. In layman's terms, Ghana students found offline F2F classroom learning more effective than ERT/L, despite academic performance showing no statistically significant difference between offline F2F and ERT/L.

Darkwa and Antwi (2021) also researched similar psychological concepts to other developed articles. Briefly, Bawa (2020) investigated the relationship between COVID-19 and academic

performance, and Supriya et al. (2021) compared offline F2F and ERT/L course grades. The developed research questions were homogeneous to the second research question asked by Darkwa and Antwi (2021). Ramachandran and Rodriguez (2020) studied student perspectives on course components and existing challenges experienced. Correspondingly, the research study by Ramachandran and Rodriguez (2020) is closely related to the first research question asked by Darkwa and Antwi (2021).

Resultantly, researchers can compare the research questions and outcomes between Bawa (2020), Supriya et al. (2021), Ramachandran and Rodriguez (2020), and Darkwa and Antwi (2021). When one does this, similarities and differences emerge from the comparison between academic performance and classroom effectiveness. Firstly, in terms of academic performance, Bawa (2020) verified the research results published by Darkwa and Antwi (2021) that ERT/L academic performance is not different to offline F2F academic performance. In contrast, the research findings produced by Supriya et al. (2021) differed from Darkwa and Antwi (2021) and Bawa (2020), as their results showed an increase in academic performance related to ERT/L. Secondly, from a classroom effectiveness standpoint, Bawa (2020), Supriya et al. (2021), and Ramachandran and Rodriguez (2020) confirmed Darkwa and Antwi's (2021) research results. The majority of students from Bawa (2020), Supriya et al. (2021) and Ramachandran and Rodriguez (2020) attributed their negative experience/ perception of learning to ERT/L. These research outcomes are constant with what Darkwa and Antwi (2021) found; for example, that offline F2F classroom learning is more effective than ERT/L.

2.2.2.2 Science and Social Science. Like the previous research study by Darkwa and Antwi (2021), Elhadary et al. (2020) also conveniently sampled over 100 university students from two different faculties that compared academic performance between the two faculties. The most remarkable difference between Darkwa and Antwi (2021) and Elhadary et al. (2020) is how Elhadary et al. (2020) operationalised academic performance and what their results data showed.

Instead of yielding to mono-operational and mono-method bias, Elhadary et al. (2020) represented student academic performance using the method and data triangulation techniques (Christensen et al., 2015). Mono-operational bias is the outcome of measuring academic performance singularly, capturing one dimension of the psychological construct (Christensen et

al., 2015; Shadish et al., 2001). At the same time, Christensen et al. (2015) and Shadish et al. (2001) explained that mono-method bias results from using one method to measure academic performance.

The problem with these two validity threats is that they diminish the construct validity of a research study. Knowing about validity threats, Elhadary et al. (2020) used three Likert scales to control for mono-method bias, demonstrating the concept of method triangulation (Christensen et al., 2015). Furthermore, data triangulation reduced mono-operational bias by constructing student academic performance from both student and lecturer experiences of ERT/L (Christensen et al., 2015).

The second notable difference between Darkwa and Antwi (2021) and Elhadary et al. (2020) is that 80.6% of Turkish students strongly preferred the ERT/L pedagogical approach, including having live online synchronous classes. These classes were then recorded and uploaded onto the university's LMS, providing registered students unlimited access to recorded classes. In fact, 47.6% of students would replay the recorded classes two or three times, and 26.7% of students watched the recordings more than three times. This functional feature facilitated the opportunity for students to learn anywhere and at any time. In addition, 65% of Turkish UG preferred asynchronous learning while watching recorded classes as opposed synchronous learning that required students to virtually attend scheduled online classes. The deciding factor was that 59% of students could continue their learning without reliable and constant software and hardware access. Students with limited access could now learn outside designated and scheduled classes.

Three-quarters of all UG students reported feelings of fear and anxiousness associated with COVID-19 despite supporting the ERT/L pedagogy. COVID-19 caused stress and restlessness, reducing students' motivation to study online. Having access to a professional counsellor who could help them deal with the current crisis was one solution with which 47.8% of students agreed, and 42.7% did not oppose. Aligned to student difficulties experienced, one-third of Turkish UG students indicated that they did not have an appropriate study environment at home, which meant that learning from home negatively affected their academic performance. Furthermore, Realyvásquez-Vargas et al. (2020) agreed that there was a negative correlation between an inappropriate learning environment at home and reduced academic performance.

Acknowledging the above, a lack of motivation and study space at home reduced student academic grades. Nevertheless, UG Turkish students were satisfied with the ERT/L pedagogy provided because of the following factors: they could access recorded classes anywhere, at any time and as many times as they liked, which helped them with content and comprehension. Furthermore, the above ERT/L characteristics also aided students with limited resources as their learning was not limited to a once-off virtual online class. Overall, the ERT/L pedagogy outweighed student difficulties experienced as UG students from both the Social Science and Science Faculties felt adequately prepared for semester exams.

As one aggregates all the sampled researched articles as previously discussed, important trends begin to emerge from this literature reviewed and compiled collection. Firstly, there is a generous amount of research on academic performance and student experiences and perceptions, where the outcomes fall inside and outside the defined academic and cultural norms standardised to university life before ERT/L.

Secondly, the literature reviewed research has emphasised three positive moderating strategies that can improve student learning experiences and perceptions (Greenhow & Galvin, 2020). In addition, Elhadary et al. (2020) suggested that professional psychological services could moderate the relationship between student anxiousness and diminished OL motivation experienced due to COVID-19. Registered psychologists could assist university students in need during a crisis such as the current pandemic. However, academic success is more likely when lecturers increase positive student experiences and motivation to study online. For this reason, it would be valuable to understand the relationship between ERT/L, COVID-19 and student fear and anxiety. Provided that professional services could positively moderate student mental health (psychological feelings and emotions).

2.2.2.3 Student Mental Health. In support of the above, it is vital to understand the basic premise of student mental health among university students. Student mental health will be contextualised by Laher et al. (2021) as published in the South African Journal of Psychology (SAJP).

Before the pandemic, Cvetkovski et al. (2019) pointed out that poor university mental health was already becoming a worldwide cumulating challenge. Understood as the product of different converged factors impeding student academic success and motivation (Bantjes et al., 2019; Cvetkovski et al., 2019) Fortunately, common precursor symptoms develop before evolving into a full diagnosed mental illness. Consequently, mental illness includes cognitive, behavioural, and social symptoms that interfere with daily activities, as illustrated by the DSM-IV (Boland et al., 2022; Sadock et al., 2015). The factors that contribute to poor mental health include but are not limited to the following: increased academic pressure, extreme financial stressors, lack of concentration, problems sleeping, depression, anxiety, stress, family, and personal complications (Bantjes et al., 2019; Cvetkovski et al., 2019).

These factors produce clusters that become evident around specific developmental life stages as observed over time. The first and second clusters form during specific developmental life transitions. The first occurs when students move from high school to university campus and the second cluster begins to form around university exams. Consequently, students are particularly vulnerable at two developmental life stages. Poor mental health influences student academic success and motivation during these life stages (Bantjes et al., 2019; Cvetkovski et al., 2019).

During the pandemic, Laher et al., 2021s-Olen (2021) came up with the following research hypothesis, “The transition to emergency remote teaching, alongside common anxieties and fears associated with the disease itself, is likely to have affected student mental health” (p. 3.). A research hypothesis is a hypothetical statement that explains or describes the relationship between or among variables (Christensen et al., 2015; Gravetter & Forzano, 2018). To test their hypothesis, the researchers selected a non-probability convenient sampling method with a non-experimental, cross-sectional design: they voluntarily sampled 160 1st and 2nd year UG psychology students registered at Wits in 2020.

The first research question quantitatively measured student mental health, self-efficacy, resilience, and coping strategies. Cooper and Kramers-Olen (2021) used six different measurement scales to answer the first research question. The six scales included the General Mental Health Scale (GMH-4), the Hospital Anxiety and Depression Scale (HADS), the Burnout Measure Scale (BMS), the Brief-Coping Orientation to Problems Experienced (Brief-COPE), the

Connor-Davidson Resilience Scale (CD-RISC), and the Generalised Self-Efficacy (GSE) Scale. The second research question qualitatively measured student study and health experiences. Cooper and Kramers-Olen (2021) used six open-ended questions that were analysed using content and (TA) Thematic Analysis, as outlined by Braun et al. (2019).

Before addressing the final research results, it is imperative to review the outcomes of the previous research article (Elhadary et al., 2020) to this research article (Cooper & Kramers-Olen, 2021). As discussed before, Elhadary et al. (2020) proposed that counselling professionals could positively moderate the relationship between ERT/L and student mental health. Against this background, Laher et al., 2021s-Olen (2021) operationalised student mental health quantitatively and qualitatively. The key is that quantitative and qualitative results contradicted one another regarding student mental health, supporting and opposing what Elhadary et al. (2020) proposed.

From a quantitative perspective, Laher et al., 2021s-Olen (2021) discovered that student mental health during lockdown level three in SA fluctuated within a normal range (no statistical differences were observed). ERT/L did not impact student mental health measured by the above six measuring scales. Derived from Elhadary et al. (2020), the research results revealed by Laher et al., 2021s-Olen (2021) can call into question the value of providing students with professional counselling services. Quantitatively speaking, student mental health did not deviate into abnormal ranges and therefore students do not need professional counselling services.

Unlike the quantitative interpretation, the qualitative insights substantiated that student mental health during lockdown level three in SA had significant ramifications. Qualitatively speaking, ERT/L did influence student mental health experiences, as demonstrated through qualitative interpretations. Consequently, professional services are necessary for university students' mental health during a pandemic.

Similar to the UG Turkish students sampled by Elhadary et al. (2020), UG South African students surveyed by Laher et al., 2021s-Olen (2021) were also overwhelmed by new emotional and environmental challenges. New emotional symptoms included and extended beyond the following: feelings of anxiety, fearfulness, sadness, detachment, and depression. New

environmental challenges included a lack of home study space and managing additional household responsibilities with online studies.

To summarise, operationalising a research construct is just as important as defining a psychological construct. Furthermore, to improve ERT/L student experiences and perceptions, lecturers and universities have some control within an OL environment. Firstly, lecturers can use the three positive moderating strategies Greenhow and Galvin (2020) suggested, improving ERT/L student experiences and perceptions.

2.2.2.4 A Proposed Framework. Previously, the research explained that not every university had access to a smooth and effective ERT/L transition, despite being the only solution to save the academic year. The paradox was that ERT/L not only illustrated a solution but in doing so, ERT/L called attention to the digital divide within and across societies. Songca et al. (2021) said that WSU could not immediately move from offline F2F learning and teaching to the new ERT/L pedagogy because their students and lecturers faced infrastructure problems, software issues, environmental obstacles, and lacked the skills and knowledge required to learn and teach online. Infrastructure problems included not having an electronic device to access the WWW, such as a smartphone, tablet, laptop, or computer. Software issues consisted of being unable to access university emails, the university LMS (WiseUP) and internet browsers (google chrome and Firefox). Environmental obstacles included no mobile or internet reception, poor internet access, low internet bandwidth and load-shedding. Finally, many students and lecturers at WSU were not digitally experienced and required online training to navigate this new mode of learning and teaching online.

Despite all these drawbacks, at the beginning of April 2020, WSU formed a technical task team with one primary directive. The objective focused on developing an overarching all-inclusive online framework that mobilised online education for everyone, regardless of geographic location, limited resources, and knowledge. This meant that lecturers and students with limited resources, such as intermittent or no online access, would have continuous and stable access because of the new all-inclusive online framework.

Over and above their short-term objective, the long-term goal was to collectively contribute to the university's 2020-2030 strategic plan, which represents a "value-driven, technology-infused African university providing a gateway for local talent to be globally competitive and make a sustainable socio-economic impact" (Songca et al., 2021, p.46). Foregrounding the promise made by Dr Blade Nzimande, the Minister of South African Higher Education, Science, and Innovation (South African Government News Agency, 2020, April 30), "Higher Education vows to leave no student behind" (p. 1.).

The way the task team approached the new ERT/L framework was that they first conducted a pilot project before mobilising a mass ERT/L roll-out. The pilot programme sampled a cohort of lecturers and students from WSU, where all participants received OL training. Lecturer participants without electronic devices and internet access were provided laptops and loaded data packages. Student participants received a tablet and loaded mobile data. Volunteered participation involved a pre-testing questionnaire, a four-week online programme and a post-testing questionnaire. The pre- and post-testing questionnaires asked lecturers and students about online capabilities, preparedness, and effectiveness. Specifically, the questionnaires had five objectives: lecturer training, online competence, student access, participation, and overall ICT support satisfaction.

During the four-week online programme, the researchers evaluated online progress weekly in terms of online platforms used (WiseUp and Microsoft Teams), type of classes (synchronous and asynchronous), activities (lectures, assessments, and discussions) and feedback (students and lecturers).

With all the information gathered from the pilot project, the task team combined that with the following reports: the "Quality Standards for Online Learning, Guidelines for Online Assessment and WSU New Approach to Teaching and Learning" (p. 48). This information formed the empirical foundation for the proposed WSU framework for overcoming ERT/L challenges.

The framework outlines key elements that need attention and consideration should ERT/L be implemented from a developing university perspective, such as WSU. In addition to earlier

discussions, lecturers and students require continuous OL training and frequent exposure to 21st century OL teaching and learning platforms. Firstly, the university staff committee should establish a community of academic information experts to assist lecturers. Such a community of experts will represent lecturers or university members with prior online and teaching knowledge and experience that can help other lecturers unfamiliar with OL. Secondly, to accommodate students, the university should establish e-PAL (online interactive websites) and e-TUTOR (to assist offline F2F tutors). Additionally, students should have access to technical support services (to assist with technical support) and a call center (to help support staff and lecturers with student problems). Equally important to mention is that the new framework is perceived with the mindset that WSU is embodying a higher institutional learning process and embarking on a developmental growth trajectory for the future.

With the success achieved by the pilot project, the new online ERT/L Framework, and the technical task team, the University Senate of WSU signed off on the multi-modal modelled approach that moved from a traditional contact model of teaching and learning to a multi-modal approach to teaching and learning. For example, WSU planned the 2021 academic calendar so that online education would continue when all registered students had returned.

As presented above, the research on ERT/L first looked at a developed perspective, investigating academic performance and student experiences (Bawa, 2020; Ramachandran & Rodriguez, 2020; Supriya et al., 2021). To end the developed section of the literature review, Greenhow and Galvin (2020) showed how social media could positively moderate the relationship between ERT/L and academic performance and student experiences. Then the research focus shifted to a developing context, examining similar psychological constructs, where homogenous and heterogenous outcomes materialised from the collective overview of the chosen journal articles.

Academic performance remained the same despite negative ERT/L student experiences (Bawa, 2020; Darkwa & Antwi, 2021). Differences unfolded when the researcher compared how the research authors defined, operationalised, and measured the psychological constructs (Darkwa & Antwi, 2021; Elhadary et al., 2020). Notably, the literature review revealed that student mental health differs according to quantitative and qualitative methodologies, as presented by Laher et al., 2021s-Olen (2021). The quantitative data showed that student mental health ranged within

normal ranges, thereby not influencing student mental health. In contrast to the qualitative findings, ERT/L influenced student experiences, thus reducing student motivation to study; and increasing negative student experiences.

Towards the end of the developing literature review perspective, Songca et al. (2021) shared how WSU overcame ERT/L obstacles through their continued pursuit of excellence by developing a new online framework relevant to the SA context. Given this information, the researcher wants to point out to the reader, that part of the research journey through the literature review is to take notice of how psychological variables are operationalised and measured from article to article. Moving forward, the researcher will now also highlight additional research article characteristics. Such as identifying how research articles operationalise and measure psychological variables like student perception.

2.2.3 Student Perception and ERT/L

To provide some background on perception, Goldstein and Hooff (2018) defined student perception as “experiences resulting from stimulation of the senses” (p. 52). Student perception is a process of experiencing the world by concurrently activating different senses that construct and interpret our experience of that lived reality. Based on the profession of psychology, perception was identified by Gravetter and Forzano, (2018) as an intangible variable, referring to variables that have abstract properties and are not directly observable. Consequentially, perception needs to be operationally defined so that the construct becomes a tangible variable that can be concretely measured and observed directly. Three examples will demonstrate the technique of operationalising a construct, converting an abstract hypothetical construct (directly immeasurable) into a tangible psychological construct (indirectly measurable). It is equally important to note that student perception is operationalised and measured heterogeneously across the next three research studies.

Firstly, Gonzalez-Ramirez et al. (2021) defined student perception according to three hypothetical and intangible constructs: exhaustion, cynicism, and professional efficacy. They measured the psychological constructs indirectly, reducing the direct measurement principle by adapting the Maslach Burnout Inventory General Survey (MBI-GS(S)). That is to say that the constructs are

defined and represented by how they were measured, illustrating the principle of operationalising a hypothetical construct.

Secondly, Abou-Khalil et al. (2021) wanted to compare student perceptions of different online engagement strategies during ERT/L, specifically when a lack of resources characterised the OL environment. Abou-Khalil et al. (2021) designed a survey with 30 questions to measure student perceptions. Each question used a five-point Likert scale, providing five options, ranging from very ineffective to very effective. The 30 questions looked at student-to-student interactions, student-to-teacher interactions, and student-to-content interactions.

Thirdly, similar to Abou-Khalil et al. (2021), Gillis and Krull (2020) also created a survey instrument to operationalise student perceptions. Rather than defining student perceptions according to Gonzalez-Ramirez et al. (2021) or Abou-Khalil et al. (2021), Gillis and Krull (2020) evaluated three aspects of student perceptions related to ERT/L: instructional techniques, utilising ERT/L instructional technique effectiveness, enjoyment, and accessibility. UG students completed part of the survey with three closed-ended options: very, somewhat, and not. The research authors also represented student perceptions affiliated with barriers as experienced by ERT/L and measured student barrier perceptions by asking the following question, "To what extent did each of the following impact your ability to succeed academically in this class/other classes?" (p. 289), listing the following options: great extent, limited extent, not at all and not applicable (Gillis & Krull, 2020).

The three examples discussed above depicted those psychological concepts, like student perception, which were defined differently across research articles. On a positive note, one way to change the abstract property of hypothetical intangible concepts is through the operational measurement procedure. On a negative note, researchers know that operational definitions are restricted (Christensen et al., 2015; Gravetter & Forzano, 2018). The limitation is that there is a disconnect in the one-to-one relationship between the hypothetical construct and the instrument used to measure it. In other words, Gravetter and Forzano (2018) posited that the operational definition captures the indirect properties and not the direct characteristics of the intangible variable. As a result, operational definitions can under-represent or over-represent an abstract concept. Under-representation means that the defined variable fails to include essential

components of the abstract concept, whereas over-representation occurs when the researchers measure unnecessary features that are not part of the abstract concept. One way to circumvent and decrease the probability of the one-to-one relationship is to review how other published authors have defined and measured student perceptions (Christensen et al., 2015; Gravetter & Forzano, 2018).

Previously, the literature review compared different operational definitions of student perceptions. This provided the reader with a brief background on how social researchers operationalise the psychological construct (student perception). While also underlining how various research articles define and measure the same psychological construct differently.

2.2.3.1 Perceived Satisfaction. The research will now start with an article by Fuchs and Karrila (2021), emphasising how quickly ERT/L took place globally. These authors explained that the Prince of Songkhla University (PSU) in Phuket, Thailand announced that ERT/L would go completely online in seven days. The implication thereof meant that the university administration team and lecturers had seven days to move from a contact teaching and learning model to an online model. Derived from an exploratory case study design, the researchers quantitatively captured student perceptions of the ERT/L experience. In addition, they conveniently sampled 561 undergraduate students registered for a Bachelor of Business Administration Degree (BBA), where 219 university students participated voluntarily. Student participation involved self-completing an online survey with 27 questions divided into three parts. The first demographic section captured student characteristics and preferred learning methods, offline F2F or online F2F. The second and third survey sections each measured 10 student ERT/L attributes. The difference between the two sections was that the former used an expectation (importance) five-point Likert scale, and the latter used a satisfaction (performance) five-point Likert scale.

Students rated important online attributes anchored between “not important at all” and “extremely important”. Students indicated their online satisfaction level between two Likert boundaries from “not at all satisfied” to “extremely satisfied”. The results from the Importance-Performance survey revealed several outcomes, as seen in the following sections (Fuchs & Karrila, 2021).

2.2.3.1.1 Important Online Learning Attributes. In Section Two (of the findings of their study) the results showed that university students regarded attribute number, A4 (Attribute 4) :The teacher is knowledgeable about the content and material of the course and A5 (Attribute five): The teacher is friendly and patient with the students, as the top two most important OL attributes. Students perceived lecturer content competence (expert on the module) and lecturer temperament (friendliness, patience) as important factors when learning online.

The top two attributes were sequentially followed by attributes A7: The course material is easy to access in the Learning Management System, A6: The course material is well and professionally prepared, A3: The teacher presents the material in an organised and coherent way, and A2: The teacher presents the material in an interesting and engaging way. To illustrate, university students perceived that easy online access via the university LMS provided with professionally prepared course material was critical with OL. Lastly, students also perceived that lecturers should prepare class content coherently using different lecturing styles to increase student interest.

In contrast to the top two important attributes, students ranked attributes A1: The teacher begins the class with a review of the previous class and A10: I am finding the course challenging and stimulating, as the least important OL attributes. Students perceived class revisions (at the beginning of each class) as the second least important OL attribute. Additionally, students rated course characteristics (challenging and stimulating) as the least important OL attribute.

2.2.3.1.2 Survey Section 3. Perceived Satisfaction (Performance). Analysing the lecturer's performance in terms of student perceived satisfaction, students indicated that they were "very satisfied" with two performance attributes (A4: The teacher is knowledgeable about the content and material of the course and A5: The teacher is friendly and patient with the students). The students were happy with their lecturer's performance for the following reasons. Firstly, their lecturer was professionally content competent (expert on the module) and secondly had the correct attitude (friendly, patient) during the ERT/L experience.

However, students said they were "not very satisfied" regarding two performing attributes (A2: The teacher presents the material in an interesting and engaging way and A6: The course material

is well and professionally prepared). Their lecturer could have improved by presenting fascinating learning material and organising the course material better. Overall, university UG students from PSU were “very satisfied” with how the university implemented ERT/L, despite 75.34% of students preferring the traditional learning model presented before COVID-19.

2.2.3.2 A Comparison of Student Perceptions. After Fuchs and Karrila (2021) collected, analysed, and published their research paper, Fuchs (2021) used the opportunity to take the research study one step further. As indicated in their conclusion, Fuchs and Karrila (2021) suggested that future research endeavors should focus on conducting multiple case study designs. Collectively combined, researchers could have a larger and more representative sample size, increasing the study’s overall research validity. Furthermore, as Schlesselman (2020) stated, HEIs need empirically supported research on alternative pedagogical approaches. As a way of contributing to this academic research need, Fuchs (2021) investigated the relationship between ERT/L and university student perceptions from both a developing and developed context: compared Thailand full-time Bachelor of Commerce (BCom) students (secondary data) to Swedish full-time BCom students (primary data). To rephrase, the research author could compare different cohorts because both secondary and primary data used the same research steps. Hence, the primary study was replicated by the second study.

Fuchs (2021) analysed student perceptions and grouped the results into three classifications. The first classification examined university type versus attribute importance (Thailand/Swedish versus 10-item attribute scale). The second outcome focused on pedagogical preference and perceived satisfaction (campus F2F/ online-F2F versus the 10-item attribute scale). Lastly, the author discussed undergraduate years with perceived satisfaction (1st, 2nd, and 3rd years versus the 10-item performance scale). For this reason, the research results will be divided into three sections, as discussed below.

2.2.3.2.1 University Type and Attribute Importance. The university-type comparison regarding important online attributes revealed two distinct patterns. The first pattern showed 10 online attributes measuring student perception differ across developing and developed universities. University students from Thailand rated A4: The teacher is knowledgeable about the content and material of the course (content competence) and A5: The teacher is friendly and

patient with the students (lecturer temperament) as the most important OL elements. Unlike Thai UG students, the Swedish UG students, rated A2: The teacher presents the material in an interesting and engaging way and A3: The teacher presents the material in an organised and coherent way, as the two most important ERT/L lecturer attributes. Swedish students perceived lecturer organisation, consistency and engaging pedagogies as the most important OL attributes.

The explanation above showed the research community that student perceptions differ from country to country, particularly when comparing student perceptions from a developed context to a developing learning environment.

This attributed difference is confirmed by A3, where Thailand UG students' and Swedish UG student perceptions differ the most regarding A3 (lecturer organisation and consistency). Specifically, Swedish students ranked A3 as their top attribute out of 10 attributes. In contrast to UG, Thailand students disagreed and scored A3, only 4 positions above the least important attribute out of 10 attributes. Unlike the first pattern focusing on differences, the second pattern showed a similarity between student perceptions in a developing and developed situation. Both student cohorts agreed that A1 was the least important OL attribute: students from Thailand and Sweden said that when the lecturer begins each class by reviewing the previous class, this is not such a vital OL feature.

2.2.3.2.2 Pedagogical Preference and Perceived Satisfaction. Fuchs (2021) highlighted one difference when evaluating student pedagogical preference against perceived satisfaction. Previously, Fuchs and Karrila (2021) explained that most (75.34%) students in Thailand preferred the traditional offline F2F learning and teaching model. Unlike the UG students in Thailand, just over half of Swedish (56.0%), students favoured the ERT/L model. To confirm this, on average, Swedish students' results were higher on the perceived satisfaction level than their Thailand comparison cohort. Regarding overall student satisfaction concerning expectations, both cohorts were "satisfied" with their ERT/L experience.

To summarise, ERT/L is more popular in Sweden than in Thailand, which is confirmed by the performance scale. Based on this single observation (one study), it could be easy to assume that students from a developed country favor ERT/L more than those from a developing country. Nevertheless, as presented previously, Elhadary et al. (2020) stated that Turkish UG students also preferred the ERT/L model more as compared to offline F2F learning model. In contrast, students from developed countries reported that ERT/L was associated with increased negative experiences and perceptions (Bawa, 2020; Ramachandran & Rodriguez, 2020; Supriya et al., 2021). Regardless of this significant pedagogical preference difference, students from Sweden and Thailand agreed that the alternative to traditional learning met their expectations in general.

2.2.3.2.3 Undergraduate Year and Perceived Satisfaction. Finally, during the last analysis, Fuchs (2021) compared student UG years against their perceived performance. The sample provided 132 (1st years), 132 (2^d years) and 68 (3rd year) students. Fuchs (2021) empirically demonstrated that there was a positive relationship between UG year and the level of student satisfaction. As students progressed from the 1st to the 3rd year, their perceived satisfaction also increased. Perhaps the reason for this difference was that first-year students are more vulnerable to ERT/L than third-year students. Therefore, the results substantiated just how crucial student training is during the 1st year of university, which was also confirmed in the ERT/L framework developed by Songca et al. (2021).

2.2.3.3 Comparison study two

Correspondingly, Cranfield et al. (2021) also selected a quantitative comparative research project to evaluate and compare student perceptions, using the same convenient sampling technique and survey design as Fuchs (2021) and Fuchs and Karrila (2021). Alternatively, Cranfield et al. (2021) sampled 559 university students across three different countries and compared university students with different histories, cultures, and digital experiences and from different economic backgrounds. For example, 240 students volunteered at a Hungarian university in central Europe. The second cohort involved 141 university students enrolled at a university in Wales within the United Kingdom (UK). The last university that participated voluntarily collected 131 student perceptions from students studying at a SAU in Africa.

The second difference was that Cranfield et al. (2021) operationalised student perceptions according to four psychological constructs, as opposed to only two, such as expectations and performance (Fuchs, 2021; Fuchs & Karrila, 2021). The four constructs included questions related to student living circumstances (home learning environment), online interaction (student engagement), pedagogical preference (participant preference) and the learning experience (impact on student learning skills). All four constructs were then measured using 12 survey questions, anchored with the same three-point Likert scale. The three-anchored Likert scale gave students the options to disagree, stay neutral or agree with 12 survey questions. Afterwards, Cranfield et al. (2021) could answer the following four research questions using the data gathered from the online student perception questionnaires.

2.2.3.3.1 Research Question 1. The first research question that Cranfield et al. (2021) asked was, “What digital learning environment did students have access to?” (p. 3.). In section one (question one), most university students from Hungary, Wales and SA were content with the following three factors, which included questions on hardware, software and living arrangements. This finding was surprisingly uncommon, as many students do not have a quiet space to study for online classes or exams (Makumane, 2021; Matarirano et al., 2021) .

Furthermore, Songca et al. (2021) explained that SAUs like WSU could not immediately adopt ERT/L. Unfortunately, students and lecturers were challenged daily by OL disadvantages because neither staff nor students have digital access at home, apart from connecting virtually on university campuses.

Despite the unexpected result, part of the answer is that South African students who participated in this research project had a laptop with loaded data packages. What is even more interesting, is that the outcome verified the success of the ERT/L framework, as discussed earlier by Songca et al. (2021). For instance, when South African students had internet access and a laptop to further their 21st century skill sets within a digitally evolving world, they flourished.

2.2.3.3.2 Research Question 2. Followed by the first research question, Cranfield et al. (2021) operationalised the second dimension of student perception by asking the following “How did students engage in the online sessions?” (p. 3.). To provide some context, of the 12 questions asked, most questions focused on student engagement. Of the four questions surveyed, responses from university students from Hungary, Wales and SA varied significantly across the three questions.

The first identified difference emerged when the largest portion of students from Hungary favoured the online learning method compared (ERT/L) to the traditional learning mode (offline F2F). Upon further investigation, the discrepancy was accounted for when the authors compared this significant difference against student age ranges. It showed that the Hungarian cohort age group was much older and thus more experienced than the younger two cohorts sampled in Wales and SA. Furthermore, Fuchs (2021) showed that there was a positive correlation between older

student groups and OL preferences. Previously, Fuchs (2021) discussed that older students were more satisfied with the OL attributes than their younger cohorts. As a result, older students gave a higher performance rating than younger students concerning important OL features.

Another factor contributing to diverged OL student perceptions was that younger students enjoyed in-person interactions more than OL ones. Approximately 75% of Welsh and South African students indicated that they missed the social aspect of traditional university life, whereas only 55% of Hungarian students agreed with that statement. University social life is less important to older students perhaps because older students study harder and longer, with module credits increasing yearly and with more module outcomes, older students have less time to socialise.

The second remarkable difference was that 53% of Hungarian students agreed that the OL environment facilitated student-to-lecturer and student-to-student interactions, whereas 55% of Welsh students disagreed. South African students equivalently agreed and disagreed with that statement. The third visible difference revealed that the older Hungarian student group maintained concentration for longer than 15 minutes per OL session, unlike the two younger groups from Wales and SA. They could not focus for longer than 15 minutes per OL session.

As indicated above, the second research question revealed many student perception polarities. To summarise, older students like those from Hungary are more inclined toward the ERT/L approach because they have sufficient OL interactions, more experience, and a longer concentration span. This differs from younger students sampled from Wales and SA who preferred the traditional campus learning and teaching model. This outcome could be associated with the vibrant university social life on campus, less OL digital experience and exposure, and shorter concentration span.

2.2.3.3.3 Research Question 3. The second last question Cranfield et al. (2021) asked was, “What were student preferences for participation with online learning platform?” (p. 3.). This question represents how similar Hungarian, Welsh and South African university students are. What stood out is that all three cohorts matched regarding student preference when studying independently and actively participating during OL sessions when not using the camera function.

2.2.3.3.4 Research Question 4. Finally, Cranfield et al. (2021) asked the fourth research question: “How did emergency eLearning education impact student skills?” (p. 3.). Derived from two of the 12 questions, approximately 70% of South African students agreed that the silver lining of their ERT/L experience was the result of two OL characteristics. Firstly, they mastered independent learning skills, and secondly, they drastically improved their digital literacy knowledge and experience. Correspondingly, 50% of Welsh and less than 50% of Hungarian students agreed to the above OL benefits.

When considering these results, it is apparent that the South African cohort benefited the most from this ERT/L experience as measured by their perceptions. In contrast, the Hungarian cohort benefited the least from the same experience. It showed that South African students had the least experience with ERT/L, whereas Hungarian students had more experience to successfully adapt to the ERT/L transition.

The comparative analysis revealed similarities and differences between university student perceptions. In terms of similarities, all three student cohorts matched with research questions one and three. All 559 students had reliable internet, the appropriate hardware to access the university’s OL management software and a home learning environment. Regarding question three, South African, Welsh, and Hungarian students were also equivalent in OL participation. All the students enjoyed working independently and engaging online without enabling the camera function.

Differences became evident based on research questions two (engagement) and four (impact). The data from question two showed that the older Hungarian cohort liked the ERT/L approach, interacted easier, and had no problems with online concentration, whereas South African and Welsh students preferred the traditional campus approach to learning because of the flourishing social life experienced on campuses, and experienced concentration problems. Research question four revealed an interesting outcome: South African students felt that they had benefited the most from the ERT/L experience. During the ERT/L experience, South African students developed independent learning skills and increased their digital knowledge bank. In contrast, Welsh university students benefitted intermittently, whereas Hungarian students benefitted the least.

Presently, this literature reviewed study has examined Thailand student perceptions based on an exploratory case study and two comparative research projects. The first comparison analysed Thai student perceptions against Swedish student perceptions. The second comparative research project examined South African, Welsh, and Hungarian student perceptions of the ERT/L experience. Moving forward, the researcher will review two more research articles, concentrating on South African student perceptions and UG students from the National University of Lesotho (NUL).

2.2.4 A South African Higher Institute

The interconnection between this journal article (Matarirano et al., 2021) and the previous ERT/L framework (Songca et al., 2021) is noticeable. Previously, South African perspectives contributed to the need for research from a multi-modal approach explicitly customised for South African students. Defining South African students as South African university students with no/ limited/ unlimited resources for OL.

During the 2^d year of the global pandemic, 2020, Matarirano et al. (2021) wanted to understand student perceptions, encounters, and perspectives related to the ERT/L experience. Expanding on this research motive, Matarirano et al. (2021) decided to use a cross-sectional survey to quantitatively encapsulate students ERT/L experiences. At the beginning of September 2020, the Department of Accounting and Finance at WSU collected 243 self-administered BCom student surveys. The online questionnaire had five parts: student demographic background, digital resources, online encounters, ERT/L perceptions and learning preferences.

2.2.4.1 Part 1: Background. The research provided background to student demographic information because previously, the research documented how UG year and student age could influence student ERT/L perceptions (Cranfield et al., 2021; Fuchs, 2021). To briefly recap, older cohorts showed greater OL satisfaction when Fuchs (2021) compared first-year UGs (Thailand and Sweden) to their third-year cohorts. Likewise, differences emerged when Cranfield et al. (2021) matched the older Hungarian university students to the younger South African and Welsh cohorts. The older group liked the ERT/L model, compared to the younger group, who voted for the traditional campus learning model. Equally important to mention is that the older group was

categorised by the upper end of the age spectrum, ranging between 20 and 30 years. By contrast, the younger cohorts were characterised by the lower side of the age spectrum.

To get back to the current journal article, most South African students who voluntarily participated fell between 20 and 25 years old. Together with the age range, the largest student group was conveniently sampled in their 2^d and 3rd year, representing over 85% of the sample.

2.2.4.2 Part 2: Digital Resources. To increase ERT/L opportunities, WSU provided students with four learning methods: Voiceover PP, pre-recorded videos, recorded online synchronous classes, and WhatsApp voice notes. Like the research outcomes revealed by Elhadary et al. (2020), Matarirano et al. (2021) verified that pre-recorded and recorded classes were more popular synchronous OL modes. These new asynchronous OL methods helped students without reliable hardware and software access to catch up academically with those who do have unlimited online resources.

2.2.4.3 Part 3: Online Encounters. As demonstrated above, South African students faced daily challenges that prohibited their ability to learn online. The five biggest challenges students encountered were running out of online data provided monthly by the university, having problems logging onto the LMS, not hearing lecturers during live synchronous seminars, experiencing errors while downloading learning content and having to deal with mobile phones not working effectively.

2.2.4.4 Part 4: ERT/L Perceptions. In the fourth part of the online survey, 10 questions measured the ERT/L perceptions of university students on a three-anchored Likert scale. The Likert scale provided students with three options: they could either disagree (strongly disagree), remain neutral, or agree (strongly agree). In contrast to UG from the USA and Turkey, who perceived the flexibility offered by ERT/L as an advantage. Viewed from a South African perspective, nearly 60% of students did not enjoy the flexibility offered by OL as they felt irritated with all the OL platforms.

The only part of the ERT/L experience that they perceived as an asset was substantiated by part two: digital resources and lecturer-student interactions: for example, pre-recorded and recorded

asynchronous online classes could help students learn at any time, at any rate, and as often as needed. Furthermore, the lecturers went out of their way to support students. For instance, they tried to accommodate students with different challenges: helping them as quickly as possible, and actively trying to interact online.

2.2.4.5 Part 5: Learning Preferences. What was striking to see is that Matarirano et al. (2021) did not only examine which learning pedagogy students preferred but also investigated the reasons behind why students favoured one over the other. Three-quarters of the students sampled supported the traditional mode of learning at university. To understand why students decided on the offline F2F method, they characterised their OL experience by a lack of study time, study space, concentration, motivation, ICT resources and socialisation.

In conclusion, Matarirano et al. (2021) highlighted crucial OL features that universities and lecturers should address when migrating from contact to an OL curriculum like ERT/L. At the same time, the research illustrated that the South African ERT/L framework (Songca et al., 2021) is far from complete. For example, South African students need digital training skills to master different OL platforms. Additionally, UG students require the correct ICT equipment and larger data packages to enjoy the OL environment. Fortunately, like the WSU technical task team, they have some background, know where to start, know which online drawbacks are the most prominent and implemented measures to address those factors.

Likewise, two things stand out when paying attention to factors that contribute to a negative ERT/L experience. First, there are specific learning elements that universities and lecturers can control, and secondly, factors that are outside their control. Unfortunately, with the global social distancing mandate, student home environments remain an uncontrolled factor. However, lecturers have other resources to increase students' OL experience/perception. Previously, it was discussed how social media (Greenhow & Galvin, 2020) and professional counselling services (Cooper & Kramers-Olen, 2021) could improve motivation, concentration, online interaction, improved mental health, creating a virtually connected OL community. The ERT/L framework (Songca et al., 2021) also illustrated essential prerequisites for developing an effective OL environment. Simultaneously, this framework represented a starting point when creating new OL curriculums, designed especially for future education based on leaving no student behind in the 21st century.

Another factor universities can improve on is addressing the issues linked to logging onto the LMS. For example, Matarirano et al. (2021) said that students had problems accessing their LMS, and as a result, this contributed to negative OL experiences and perceptions. Therefore, to add to various resources that could possibly be used to improve student ERT/L experiences and perceptions, this research project will look at one more aspect OL, namely LMS (Makumane, 2021).

2.2.5 National University of Lesotho

Before the pandemic, learning environments in developing countries, like NUL, already had an established online LMS, since the university used the Thuto LMS in addition to the dominant traditional learning modes. Unfortunately, because of frequent power outages, poor connections, and high data costs, fewer students and lecturers opted to use the Thuto LMS (Makumane, 2021).

However, when COVID-19 became a global reality with daily infections rising in SA, it was a matter of time before COVID-19 would reach the Lesotho borders, landlocked by SA. Makumane (2021) explained that, with limited alternatives, the Thuto LMS became the primary OL medium for students and lecturers who could access this platform to continue the academic year. The effect created many research opportunities, so Makumane (2021) decided to explore the relationship between university student perceptions and the universities LMS (Thuto).

The author has explained that the university's LMS (Thuto) determined factual, social, and habitual student perceptions, in other words, how students interact with the university's LMS shapes their perceptions. If students have a positive experience using the university's LMS, the students' perceptions will be positive, compared to negative student perceptions, which are the result of negative interactions with the LMS (Thuto).

Makumane (2021) defined factual perceptions as the cognitive function of the LMS: students who cognitively understand how to use the LMS will have a better or positive LMS perception. In contrast, students who cognitively do not understand how to use the LMS will have a worse or negative LMS perception. Secondly, Makumane (2021) defined social perceptions as the LMS's social norms: for example, a social norm of the Thuto LMS could be that everyone in the module regards the platform as user-friendly and interactive. Subsequently, more students will perceive

the platform as a positive experience. Put differently, social perceptions depend on the overall experience of the class. Lastly, habitual perceptions refer to a student's technological experience. Technologically savvy students will perceive the experience using the Thuto LMS as more positive than students who are less inclined to explore new technologies.

Regarding comparison, the first difference is that Matarirano et al. (2021) used a closed-ended online survey with a descriptive research design based on a quantitative methodological approach. In contrast to this research article, Makumane (2021) used 10 online participant reflective journals and focus group discussions with an interpretative case study design based on a qualitative research approach. Secondly, differences have unfolded on a theoretical departure point too, making the research more interesting.

Osanloo and Grant (2016) said that theoretical departure points represent psychological theories that are a researcher's master key that can unlock the entire research process. Metaphorically speaking, a psychological theory can be understood as the blueprint used to crack a researcher's safe (Imenda, 2014; Osanloo & Grant, 2016). Different routes show alternative ways of reaching the same outcome, empirically supported research, depending on the type of light used to view the blueprint. For example, under blue light, researchers see a quantitative methodology, whereas, under pink light, researchers can see a qualitative path. Additionally, under red light, a mixed methods route becomes visible.

Aligned to this background, the following are visible theoretical differences between Makumane (2021) and Matarirano et al. (2021). Matarirano et al. (2021) used Vygotsky's cognitive learning theory, known as the sociocultural theory, to theoretically underpin how student perceptions are shaped in a learning environment. According to the sociocultural theory, as Snowman and McCown (2013) discussed, students learn better when teachers incorporate social and cultural aspects into the learning process, enhancing students' cognitive development.

Whereas Makumane (2021) interpreted the TPACK framework as their theoretical foundation for student perceptions within an OL community. According to the TPACK perspective, different levels (different interactions) influence student perceptions. On the first TPACK level, technological, content, and pedagogical learning features shape student perceptions in an OL environment. This level and other levels related to the TPACK will be discussed later. At this

moment, the reader should take notice that different psychological theories explain student perceptions differently. Correspondingly, each research approach uses different techniques and research steps to understand student perceptions. For instance, Makumane (2021) used a qualitative research methodology to explore student perceptions of the Thuto LMS. For this reason, the results produced three qualitative themes, including factual, social, and habitual perceptions.

2.2.5.1 Theme 1: Factual Perceptions. The first qualitative theme revealed that students have positive and negative student LMS perceptions. The advantage was that students described the LMS as a professional and easy-to-access learning platform. Students always had access to module-related content and recorded classes. The disadvantage was that LMS did not include social interactive features.

2.2.5.2 Theme 2: Social Perceptions. As recommended in the first qualitative theme (Factual Perceptions), the social dimension of OL was entirely represented in the second theme (Social Perceptions). The qualitative outcome explicitly demonstrated that students do not want but need interaction with others when learning online. Students also recommended that the university's LMS integrate with external informal Social Media Platforms (SMP). SMP include WhatsApp groups, Zoom classrooms, FB communities and YouTube resources; directly and instantly increasing student-to-student interactions and student-to-lecturer interactions. The social space can help students with content comprehension by sharing other YouTube videos with one another. Furthermore, students can share content-related problems on their FB or WhatsApp groups. Together, they can learn from one another by grasping abstract concepts quicker based on different student interpretations. In fact, Greenhow and Galvin (2020) confirmed that SMP facilitate the teaching process and reduce negative OL experiences and perceptions.

2.2.5.3 Theme 3: Habitual Perceptions. As depicted by habitual perceptions, the last qualitative theme is summarised by two sub-themes. The first sub-theme was labelled perceptions on goals, followed by the second sub-theme, named perceptions on accessibility. Regarding UG perceptions related to educational goals, all 10 students were not entirely satisfied. Their main concern was that the Thuto LMS is a nice theoretical learning tool but could not achieve or facilitate the practical side of OL.

Moving to perceptual accessibility, the qualitative theme revealed three interpretations. In other words, there are three ways to interpret Perceptual Accessibility, encapsulating digital, financial, and cultural interpretations. First, digital access denoted UG students with the digital resources (hardware, software, and infrastructure) to log onto the Thuto LMS. The second aspect to consider is that OL has financial aspects. Affordability directly influences how students perceive the Thuto LMS. Even when students have the correct digital resources and the financial means to learn online, one more aspect contributes to student perceptual access: cultural accessibility. Finally, cultural accessibility refers to an individual's OL experience. A positive experience can produce positive cultural interpretations, whereas a negative experience could create negative cultural perceptions.

Aligned to these interpretations, UGs appreciated that their zero-rated LMS. Zero-rated meant that registered lecturers and students could connect to the Thuto LMS without incurring financial costs. The benefit was that the move to a zero-rated platform changed students' perceptions and interpreted the OL experience as an overall benefit. Despite the success of the zero-rated Thuto LMS, students encountered other drawbacks, such as frequent network issues related to the online platform. Without strong OL networks, students could not always use the zero-rated platform. Unfortunately, digital resources compromised positive student perceptions and experiences. However, prior LMS experience helped students adapt and navigate the OL community. Instead of giving up, the students used their cultural accessibility (personal online experience) to complement the university's learning platform with additional SMPs to continue their academic progress.

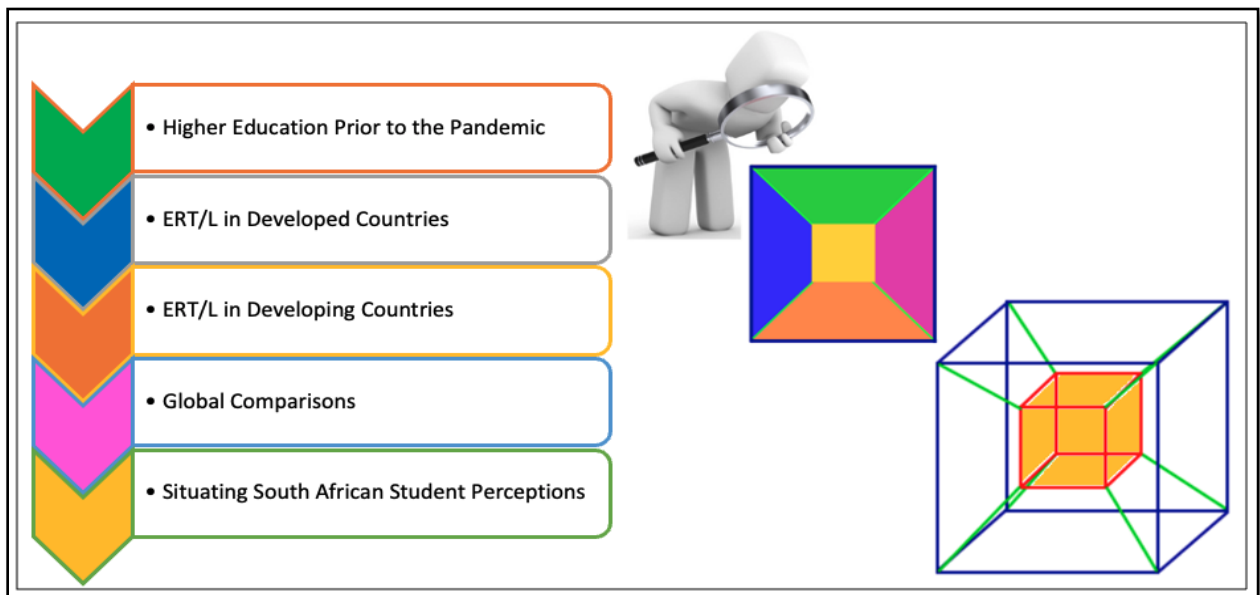
To summarise, factual, social, and habitual student perceptions support the use of SMPs. In addition to this, SMPs provided empirical qualitative evidence that universities could use to improve student OL perceptions and experiences. Secondly, universities can complement the above strategies with student access to professionals. Counselling psychologists can help students manage new experiences, thereby improving students' mental health and motivation to learn online. These represent short-term solutions, but what about long-term solutions? Since the Lockdown Level 5 in SA, COVID-19 has moved across the globe in waves (Ellis, 2022 April 24). Should lecturers and universities want long-term solutions, the research article published by Songca et al. (2021) could provide some insight into the future for OL.

2.3 Literature Review Conclusion

As discussed above and in summary, the relationship between ERT/L and student perceptions can be characterised as a multi-dimensional research process. Fortunately, Booth et al. (2016) noted that part of a researcher's craft is to simplify the entire research process. As Albert Einstein once said, "If you can't explain it simply, you don't understand it well enough" (p.471), as cited in Scaramuzza and Rabbone (2021).

In simplifying the research process, the second part of the challenge is about how successfully the researcher operationalises the abstract and intangible relationship so that the reader understands how and why as related to the research journey (Booth et al., 2016). Based on a macro perspective, the reader will see that the Literature Review represents a four-dimensional box as demonstrated in figure 4.

Figure 4
The Four-Dimensional Box



When looking at Figure 4, one should perceive the four-dimensional box as a theoretically constructed two-piece puzzle consisting of a lid and a box. The lid of the box represents the research question, "What are university students' perceptions of ERT/L at a South African university?" which guides the literature review based on the TPACK Theory.

The five sides of the box, including the four sides and one bottom side, represent the literature review, moving clockwise. The first side of the box briefly introduces SAHE before the pandemic. The following sides (2 - 5) discussed relevant research related to HE during the COVID-19 pandemic. The literature review started with a developed perspective and ended with a developing point of view, thus taking on a funnel flow of information (Hofstee, 2006). To elaborate on the funnel flow of information, side 2 of the four-dimensional box examined ERT/L from a post-industrial perspective (Bawa, 2020; Greenhow & Galvin, 2020; Ramachandran & Rodriguez, 2020; Supriya et al., 2021). Side 3 then evaluated the same topic but from an economically developing point of view (Cooper & Kramers-Olen, 2021; Darkwa & Antwi, 2021; Elhadary et al., 2020; Songca et al., 2021). Side 4 then took a comparative approach, sampling and comparing cohorts across different nations (Cranfield et al., 2021; Fuchs, 2021; Fuchs & Karrila, 2021). Finally, the bottom slide, as depicted by the neck of the funnel, concentrates exclusively on South African (Matarirano et al., 2021) and African student perceptions (Makumane, 2021).

In the final literature reviewed analysis, all the researched articles throughout Sections One (before the pandemic) and Two (during the pandemic) produced two attributes that continually re-emerged throughout the literature review. On the one side, there are risk factors associated with both HE before (Czerniewicz et al., 2019; Potgieter et al., 2019; Tekane et al., 2018) and during the pandemic (Greenhow & Galvin, 2020; Makumane, 2021; Songca et al., 2021). On the other side, educational institutions evolved, as a result, cultivating protective resources before (Czerniewicz et al., 2019; Potgieter et al., 2019; Tekane et al., 2018) and during the pandemic (Greenhow & Galvin, 2020; Makumane, 2021; Songca et al., 2021). Consequently, the experience shaped resilient lecturers and students who could acclimatise to learning environments during times of great turbulence.

Below the reader will see Table 2, The Quadrant Map Literature Review Conclusion which illustrates risk factors and protective resources. The quadrant map should be a familiar concept as it was previously discussed by embedding it into how lecturers can teach using social media (Greenhow & Galvin, 2020). The difference is that the researcher used the asset-based map to visually summarise the entire research literature review (Ferreira & Ebersöhn, 2012). Altogether, the quadrant map foregrounds the current academic literature relevant to the research question, contextualising SAHE before the pandemic (Section One) and during COVID-19 (Section Two). Together with Sections One and Two, they created Section Three (the overall conclusion).

Table 2

The Quadrant Map Literature Review Conclusion

Person Protective Resources		Environmental Protective Resources	
Higher Education Prior to the Pandemic		Higher Education Prior to the Pandemic	
<ul style="list-style-type: none"> Spanish flu: none Student # movements: Resilient lecturers – “Resilient” blended learning pedagogies. 		<ul style="list-style-type: none"> Spanish Flu: PPG and social distancing Student # movements: Learning Management system (LMS) – could enable online learning 	
Higher Education During the Pandemic		Higher Education During the Pandemic	
<ul style="list-style-type: none"> Lecturer content competence and lecturer temperament (Bawa, 2020; Fuchs & Karrila, 2021) Lecturer organisation , consistency and presenting interesting content using engaging teaching methods(Fuchs, 2021) Student positive perceptions/ experiences Learning benefits: Independent learning (Cranfield et al., 2021), Increased responsibilities(Bawa, 2020), Flexibility(Bawa, 2020; Makumane, 2021; Supriya et al., 2021) Technical benefits: Digital literacy (Cranfield et al., 2021) 		<ul style="list-style-type: none"> Teaching with social media (Greenhow & Galvin, 2020) A Proposed Framework (Songca et al., 2021a) Social Media Sites, SMS: Facebook, WhatsApp, Twitter, Instagram (Makumane, 2021) Access to professional mental health services (Cooper & Kramers-Olen, 2021). Zero-rated Learning Management System (LMS), (Makumane, 2021) → Digital resources (Elhadary et al., 2020; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021) 	
Person Risk Factors		Environmental Risk Factors	
Higher Education Prior to the Pandemic		Higher Education Prior to the Pandemic	
<ul style="list-style-type: none"> Spanish flu: Lecturers could not teach, and students could not learn. <ul style="list-style-type: none"> Student # movement: Digital Divide 		<ul style="list-style-type: none"> Campus closure: Spanish flu (Strydom, 2020) <ul style="list-style-type: none"> Intermittent campus closure: Student protesting movement of #RMF and #FMF(Booyesen, 2016; Langa et al., 2017) 	
Higher Education During the Pandemic		Higher Education During the Pandemic	
<ul style="list-style-type: none"> Student negative perceptions/ experiences Social problems: A lack of socialisation (Makumane, 2021; Matarirano et al., 2021; Supriya et al., 2021). Psychological challenges: Motivation (Elhadary et al., 2020; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021), Anxiety/Fear(Elhadary et al., 2020; Ramachandran & Rodriguez, 2020), Isolation(Supriya et al., 2021). Technical issues: ICT resources(Matarirano et al., 2021; Ramachandran & Rodriguez, 2020), Inexperienced online capabilities(Cranfield et al., 2021) 		<ul style="list-style-type: none"> COVID-19 rules and regulations: Social distancing mandate, ERT/L, campus closure. Digital divide -> Surrounding environmental limitations: Load-shedding, lack of cell-phone reception (Makumane, 2021; Matarirano et al., 2021; Songca et al., 2021a) A Lack of access to professional mental health services (Cooper & Kramers-Olen, 2021). 	

Person Risk Factors (continued)**Higher Education During the Pandemic (continued)**

- Learning setbacks: Study space (Elhadary et al., 2020; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020), Online comprehension (Bawa, 2020; Supriya et al., 2021)
 - A lack of time (Matarirano et al., 2021; Ramachandran & Rodriguez, 2020),
 - Reduced concentration(Cranfield et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021), Overwhelmed by workload(Bawa, 2020; Supriya et al., 2021)
(Bawa, 2020; Cooper & Kramers-Olen, 2021; Cranfield et al., 2021; Darkwa & Antwi, 2021; Elhadary et al., 2020; Fuchs, 2021; Fuchs & Karrila, 2021; Makumane, 2021; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Songca et al., 2021a; Supriya et al., 2021)
-

2.3.1 Higher Education Prior the Pandemic

SAHE has come a long way since the 20th century (Strydom, 2020). The educational growth is especially evident when comparing risk factors and available protective resources during the Spanish Flu of 1918, South African #student protests, and COVID-19. The Spanish Flu of 1918 ceased the academic calendar, and UP cancelled campus lectures. As a result, students were either confined to their allocated university residencies or sent home. At the time, the university's curriculum depended entirely on the outcome of the Spanish Flu (Robinson, 2021). Lecturers did not have alternative teaching methods to circumvent the effects of the epidemic but fortunately, the pandemic only lasted a couple of months before the HE industry regained its learning momentum.

Approximately one century later, Czerniewicz et al. (2019) averred that the South African student #movements (#RMF and #FMF) interrupted academic progress intermittently and spanned over two years, affecting the HE community differently. Some institutions quickly adapted to RBL methods, while others only began evaluating the feasibility of BL pedagogies (Potgieter et al., 2019; Tekane et al., 2018). To point out, lecturers had protective resources to continue student academic progress.

2.3.2 Higher Education During the Pandemic

The research published and reviewed during the pandemic revealed several outcomes. Firstly, the entire educational sector had to expeditiously remodel the traditional teaching model without prior planning (Makumane, 2021; Matarirano et al., 2021; Songca et al., 2021). Subsequently, HEI used what was referred to as ERT/L (Hodges et al., 2020) to adapt teaching approaches and learning styles suited to a pandemic context. ERT/L can be regarded as a new learning OL environment. Hodges et al. (2020) explained that ERT/L is similar but different to other BL methods. The upside was that ERT/L and e-Learning pedagogies improved 21st century student OL environments. The downside was that the existing E-Learning pedagogies have institutional planning with appropriate educational objectives and outcomes, whereas ERT/L does not.

Secondly, the ERT/L experience has affected lecturers and students alike; therefore, the new OL environment has introduced new and different learning advantages and disadvantages, as

presented in Table 2: The Quadrant Map Literature Review Conclusion (p. 54). The former (advantages) refers to protective resources, and the latter (disadvantages) demonstrates risk factors. The researcher divided the student ERT/L OL experience into two halves: the first half embodied protective resources, and the second half displayed risk factors.

Lecturers can positively moderate the relationship between ERT/L and negative experiences and perceptions using protective resources. Protective resources are teaching aids that lecturers could use against ERT/L risk factors, and these include individual as well as environmental protective resources. On the individual level, lecturers have their personality traits (Bawa, 2020; Fuchs & Karrila, 2021), professional skillset (Fuchs, 2021) and the knowledge of learning and teaching benefits associated with the ERT/L experience (Bawa, 2020; Cranfield et al., 2021).

On the environmental level, lecturers can use a variety of existing assets to facilitate a positive ERT/L perception. These assets include teaching with social media (Greenhow & Galvin, 2020), using SMPs (Makumane, 2021), and taking a new proposed framework approach (Songca et al., 2021). In addition, lecturers can improve student mental health with professional services (Cooper & Kramers-Olen, 2021) and use zero-rated web learning platforms (Makumane, 2021).

Risk factors include person and environmental features that contribute to negative ERT/L perceptions. Person risk factors include social problems (Makumane, 2021; Matarirano et al., 2021; Supriya et al., 2021), psychological challenges (Cooper & Kramers-Olen, 2021; Elhadary et al., 2020; Ramachandran & Rodriguez, 2020), technical issues (Matarirano et al., 2021; Ramachandran & Rodriguez, 2020), and new learning setbacks (Cranfield et al., 2021; Matarirano et al., 2021).

Environmental risk factors consist of COVID-19 laws (Makumane, 2021; Matarirano et al., 2021), the digital divide (Makumane, 2021; Matarirano et al., 2021) and lack of access to professional services (Cooper & Kramers-Olen, 2021).

Lastly, aligned to the quadrant map, the reader should be familiar with the following: Who identified the risk factors and protective resources (The authors that published the articles as

discussed in the literature review), and what are they. Additionally, where on the quadrant map are they located and when did they become applicable to the ERT/L context in SA. The reader may also ask, "Why are some and not all the elements (advantages and disadvantages) present in all the research articles?". To answer this question: different psychological theories outline how students' perceptions are perceived. For instance, social researchers operationalise perception depending on their chosen theoretical point of view, the psychological theory governing human behaviour (Christensen et al., 2015; Creswell & Creswell, 2018). When looking at the four-dimensional box (Figure 4, p.52), this research study constructed student perceptions according to the TPACK theory; therefore, different, or similar advantages and disadvantages may emerge.

2.4 Theoretical Departure Point: Technological Pedagogical Content Knowledge (TPACK)

The theoretical departure point of a dissertation is one of the most important, if not the most critical decision the researcher makes (Osanloo & Grant, 2016). (Iqbal, 2007) said that the theoretical framework is "the most difficult but not impossible part of [the] proposal" (p. 17). Mertens (2019) added that the departure point "has implications for every decision made in the research process" (p. 3). A dissertation's framework is fundamental, challenging, and consequential because it substantiates the whole research process with a defined theory (Osanloo & Grant, 2016).

Previously, Osanloo and Grant (2016) described a dissertation's theoretical framework as the "blueprint" of a house. According to the author's analogy, the framework consists of two blueprints. The first blueprint is the evaluation blueprint drawing, which provides the audience with an external view of the research (exterior view of a house). The audience can see the exterior view of the research when they look at the dissertation's table of contents. For example, the Table of Contents includes five structured chapters, namely the introduction (Chapter 1), the literature review (Chapter 2), the methodology (Chapter 3), the research findings (Chapter 4) and the conclusion (Chapter 5).

When the reader looks at the floor plan blueprint (second blueprint), they will see the interior details of the research (interior view of the house). Osanloo and Grant (2016) explained that the interior details refer to the "theoretical principles, constructs, concepts and tenants of a theory" (p. 16). The interior details are evident when the audience evaluates the contents of each chapter. For instance, the audience can ask themselves, "Does the content of each chapter address what

it is supposed to?" To be more specific, the audience can ask themselves, "Does the researcher discuss the research theory in the theoretical framework section of the dissertation?"

The secret is that the research structure (external view of the house) and the research details (internal view of the house) integrate in such a way that the structure and details of the dissertation become indistinguishable from one another (Osanloo & Grant, 2016). This interconnection occurs as the researcher guides the audience through each chapter, pointing out crucial features. Additionally, the researcher demonstrates how each section aligns (compliments) another chapter and, collectively, shows how each chapter contributes to the golden thread (overall research purpose).

2.4.1 Theory

Imenda (2014) stipulated that the "theoretical framework is the application of a theory" (p. 189). Kivunja (2018) explained that the theoretical departure point is the dissertation section that situates, summarises, and supports the researcher's theory. Eisenhart (1991) said that the theoretical framework is "a structure that guides research by replying on a formal theory...constructed by using an established, coherent explanation of certain phenomena and relationships" (p. 205).

Within this context, the reader can interpret a theory as the best available explanation used to understand the relationship between ERT/L and student perceptions (Hofstee, 2006). Fortunately, many theories explain the relationship between these two variables; the trick is to find the right one. For example, in Chapter 2 (literature review), the researcher came across one: Moore's Model of Interaction (Abou-Khalil et al., 2021), two: Hofstede's Cultural Dimensions (Cranfield et al., 2021), three: Vygotsky's Sociocultural Theory (Matarirano et al., 2021) and four: the TPACK framework (Makumane, 2021). The reader should recall theories three and four as the researcher briefly mentioned Vygotsky's sociocultural theory (Matarirano et al., 2021) and the TPACK framework (Makumane, 2021). When the researcher compared and analysed these four theories and other relevant online learning theories, as discussed by Jnr and Noel (2021), the TPACK Theory stood out from the rest.

The first characteristic that sets the TPACK model apart is that it embodies the developmental growth of teacher knowledge (Mishra & Koehler, 2006; Phillips & Harris, 2018). The TPACK model demonstrated development growth when the model moved beyond Shulman's (1986) initial Pedagogical Content Knowledge (PCK) ideas. That is to say that the theory of knowledge regarding teacher knowledge has evolved.

On a positive note, Mishra and Koehler (2006) pointed out that the advancing industrial revolution has shaped and complemented the growth of teacher knowledge. Teacher knowledge has expanded with technological knowledge, and as a result, 21st century technologies have replaced traditional transparent classroom technologies. For example, teaching and learning moved from paperback textbooks and chalkboards to electronic books and online recorded lectures.

On a negative note, Mishra and Koehler (2006) denoted that many lecturers and students require technical training to use electronic books and upload recorded online lectures. Songca et al. (2021a), Matarirano et al. (2021) and Makumane (2021) substantiated the above as illustrated in Table 2 (The Quadrant Map Literature Review Conclusion on pages 53-54). Even if lecturers are technically knowledgeable, this does not automatically mean that teachers apply technically advanced tools to facilitate teaching and learning (Mishra & Koehler, 2006). Mishra and Koehler (2006) stated the following, "merely knowing how to use technology is not the same as knowing how to teach with it" (p. 1033).

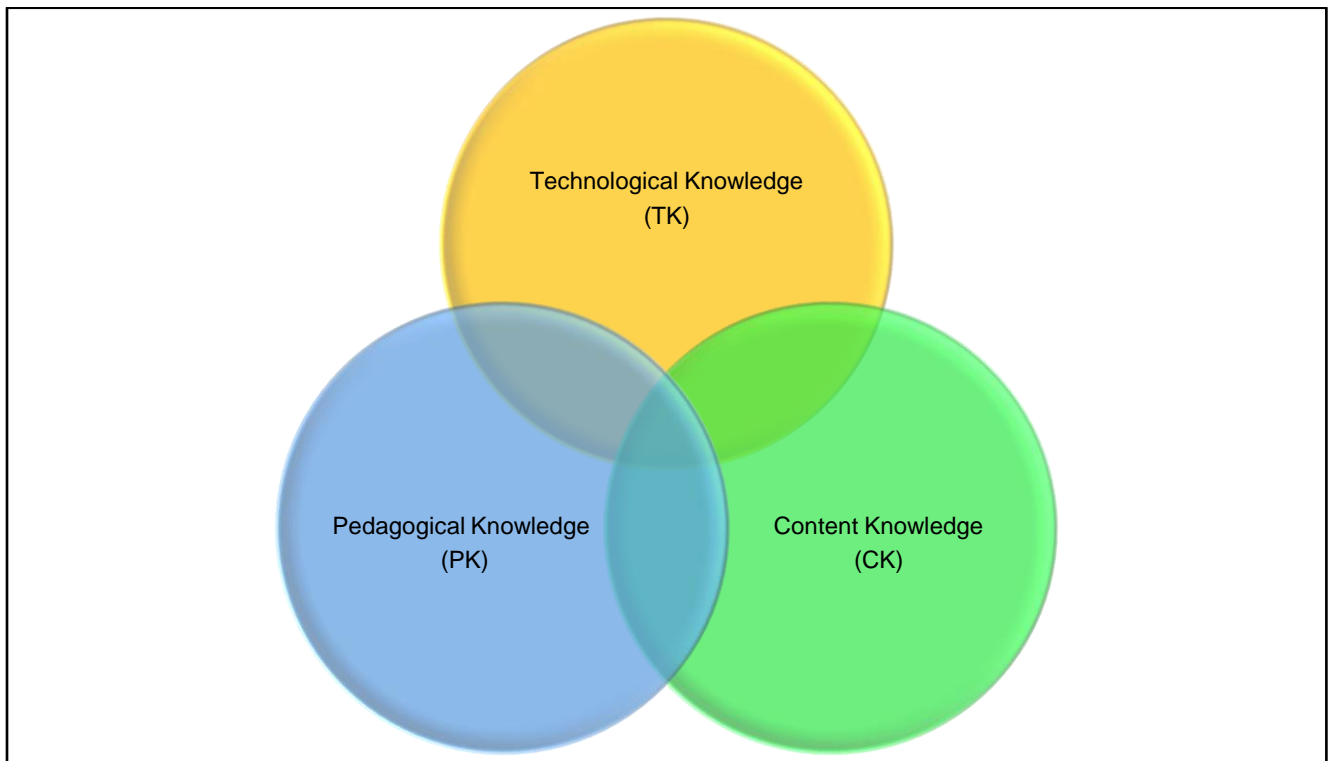
The second TPACK characteristic that stood out is that Jnr and Noel (2021) identified the framework as an online learning and teaching theory. The TPACK theory is especially relevant to the global ERT/L transformation that has taken place during the pandemic lockdown. Juanda et al. (2021) averred that the TPACK theory is relevant when researchers want to understand the transfer to ERT/L.

The third reason is that Jrn and Noel (2020) demonstrated how the TPACK model summarises and unifies itself to other online learning theories. Other online learning theories included the Substitution, Augmentation, Modification, Redefinition (SAMR) model; Passive, Interactive, Creative, Replacement, Amplification, Transformation (PICRAT) model; Connectivism Model;

Online Collaborative Learning (OCL) model and the Col model. Collectively, these online models share three common characteristics: the learner, technology, and teaching.

Given the abovementioned points, the researcher used the TPACK approach as an overarching theory to answer the research question and operational student perception. The researcher will now provide a brief overview of the TPACK Theory, starting with the inception of the PCK framework. This way, the reader can decide if they agree with the researcher's TPACK Theory choice. In this section, one will see that the theory is distinctive, drawing attention to the theory's structure and components of the framework. Furthermore, the researcher will connect each TPACK component to the operational definition of student perceptions.

Figure 5
The TPACK Theory



Note. TCK= Technological Content Knowledge, PCK= Pedagogical Content Knowledge, TPK= Technological Pedagogical Knowledge, and TPACK= Technological Pedagogical Content Knowledge.

2.4.2 Pedagogical Content Knowledge Framework

Historically, before the PCK framework, academic scholars perceived teacher knowledge to be represented by two independent and separate domains (Mishra & Koehler, 2006).

Figure 6
Independent Knowledge Processes



Source: Note. Mishra & Koehler, 2006

The first domain is called Content Knowledge (CK), and the second is Pedagogical Knowledge (PK). Mishra and Koehler (2006) explained that CK evaluates a lecturer's skills according to their content competency, and those who demonstrate CK have students who perceive them as content competent. To operationalise CK, the researcher asked students, "Is your lecturer a module expert?" (Fathi & Yousefifard, 2019). UG Thailand students perceived their lecturers as content experts and were "very satisfied" with their performance (Fuchs & Karrila, 2021).

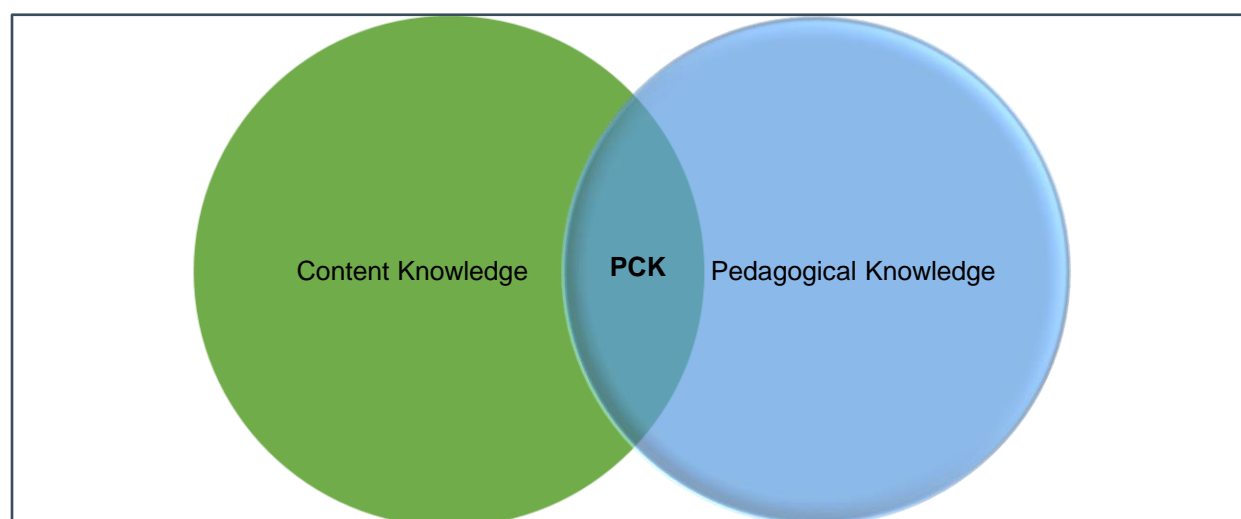
In contrast, PK examines effective teaching methods: for instance, lecturers who use effective methods understand how to teach their students according to their learning needs (Mishra & Koehler, 2006). To ask a PK-related question, the researcher asked students, "Does your lecturer understand students' learning difficulties?" (Fathi & Yousefifard, 2019). However, when lecturers do not understand student learning challenges, the outcome leads to poor student teaching perceptions, as Bawa (2020) reported.

Previously, when a lecturer planned for a future class lesson, what content (CK) they would cover was perceived as independent or irrelevant from how (PK), the content was presented to their

students. According to Mishra and Koehler (2006), the outcome of this produced academic literature dominated by either CK or PK, associating lecturer knowledge with hierarchical and dichotomous characteristics. Instead, Shulman (1986) opposed this independent teacher knowledge perspective and proposed that CK and PK are equally important and dependent domains. The focus should not be on how different the two domains are but on how the domains complement one another. When teachers think of their next class lesson, they should simultaneously use their content and pedagogical knowledge skills, constructing what is known as Pedagogical Content Knowledge (PCK), alternatively known as the PCK Framework.

Figure 7

The PCK Framework



Note. Pedagogical Content Knowledge (PCK) is the combination of Content Knowledge (CK) and Pedagogical Knowledge (PK) (Mishra & Koehler, 2006).

Shulman (1986) and Mishra and Koehler (2006) averred that lecturers need to realise that what they teach (CK) and how they teach (PK) cannot be seen as separate processes that individually influence effective teaching. However, when lecturers realise the value of understanding the interactions between CK and PK, they redefine teacher knowledge based on their knowledge interactions. Therefore, PCK refers to how lecturers use effective teaching strategies designed and tailored to the type of content they want to teach. In doing that, lecturers enhance their teaching strategies, modes, and processes. To demonstrate, the researcher asked students, "At the end of the class, did you understand what your lecturer presented?" If students do understand

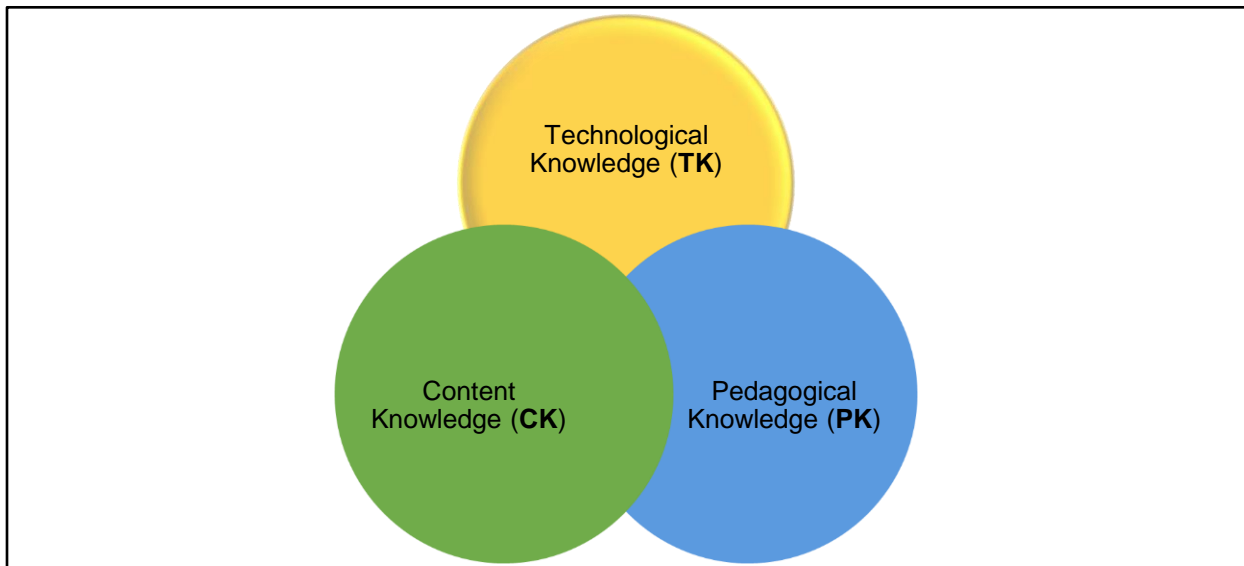
what was presented in class, the lecturers know that they used the right pedagogical approach with the type of content they taught. Supposing the students do not understand what was presented in class, the lecturers know that they need to change their pedagogical approach to enable their students to understand the content objectives for each class.

2.4.3 Technological Pedagogical Content Knowledge Framework

With the teaching fundamentals laid out by Shulman (1986), Mishra and Koehler (2006) added a third variable, TK, to the original PCK framework. TK illustrates a lecturer's knowledge and experiences in using technology in the classroom. To measure TK, the researcher wanted to evaluate students' perceptions of their teachers' technical skills. Thus, the researcher asked, "Did your lecturer know about basic computer hardware and software components?" (Fathi & Yousefifard, 2019). When Mishra and Koehler (2006) combined the PCK framework with the TK teaching element, they created the TPACK/TPCK model that defines teacher knowledge according to seven intersecting elements. The reader should assimilate the TPACK model to an oil painting of teacher knowledge with three different layers, the base, middle, and topcoat. First, the artist applies the base coat's three primary colors (green, red, and blue), representing CK, PK and TK.

Figure 8

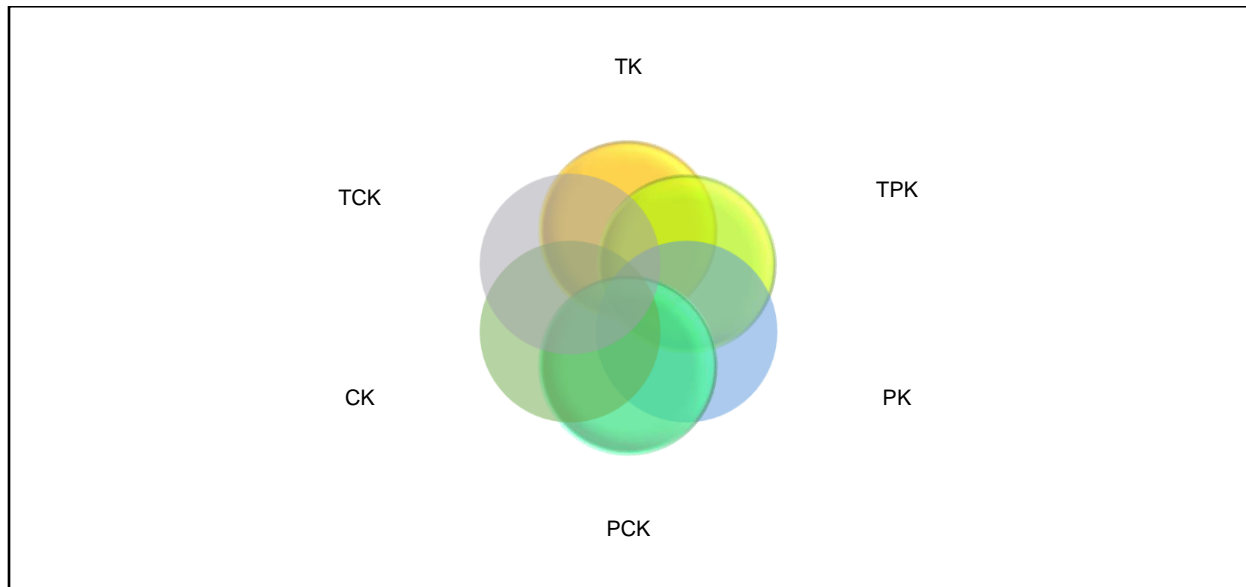
Teacher Knowledge (Base coat)



Note. Teacher knowledge (oil painting base coat).

Figure 9

Teacher Knowledge (Middle coat)



Note. Teacher knowledge (oil painting middle coat). Moving clockwise, TK= Technological Knowledge, TPK= Technological Pedagogical Knowledge, PK= Pedagogical Knowledge, PCK= Pedagogical Content Knowledge, CK= Content Knowledge, and TCK= Technological Content Knowledge.

2.4.4 Technological Content Knowledge Component

TCK is the product between TK and CK. TCK occurs when the lecturer weighs the benefits and barriers of utilising technology to facilitate student content understanding and application learned during class. Lecturers should ask themselves, "How can I use technology to help students understand and relate better to the content I want them to understand?". For example, the researcher measured the lecturer's TCK skills by asking students, "Did your lecturer use technology that helped you understand the module content better? (e.g., Using more than one example)" (Fathi & Yousefifard, 2019).

Additionally, lecturers can use technology to help students with the following: for instance, UG chemistry students from UCLA (Ramachandran & Rodriguez, 2020) verified that recorded classes would help with content comprehension. Furthermore, UG Social Science and Science students from Turkey agreed that the greatest advantage of OL was being able to re-watch recorded classes as many times as needed (Elhadary et al., 2020). The type of technology used will depend

on the type of content and the availability of technology. Lastly, Juanda et al. (2021) denoted that technology can provide an alternative path in helping learners understand content that was previously difficult to conceptualise.

2.4.5 Technological Pedagogical Knowledge Component

TPK is about knowing how and when to use technology in the teaching and learning process (Mishra & Koehler, 2006). The lecturer looks at two factors, namely the learning objectives and learning context. TPK occurs when the lecturer matches the learning objectives to the learning context and uses digital tools to facilitate learner outcomes. Lecturers use different types of technology (paperback textbooks, online academic articles, TedTalks) to help students achieve their module outcomes. ERT/L represents the TPK components because it is how lecturers used technology to continue learning despite the pandemic lockdown regulations. To demonstrate, the researcher operationalised a lecturer's TPK skills by asking students, "Did your lecturer use technology to improve their teaching skills (e.g., presenting live online classes)?" (Fathi & Yousefifard, 2019).

2.4.5 The Technological Pedagogical Content Knowledge Component

For the top oil coat, the artist finalises the painting by mixing three primary and secondary colours that create the colour black, which is used to outline the painting. The colour black shows that teacher knowledge considers three domains of knowledge (CK, PK, and TK) and three intersected pairs of knowledge (PCK, TCK and TPK) that all come together and formulate the final component, the TPCK element. The TPCK element defines teacher knowledge using two levels, i.e., the base and middle coat. In other words, when a lecturer designs an online module within seven days because of the pandemic, they look at the following factors and how they complement one another. Firstly, lectures look at content type (CK), pedagogical options (PK), and technological access (TK). Secondly, lecturers match their modules' contents to the best pedagogical options (PCK) while also considering how available technological options can support learner outcomes (TCK) and progress (TPK). Therefore, when lecturers design online teaching modules, their effectiveness is determined by how they practically use and apply all the TPACK principles simultaneously. For example, to measure student's overall TPACK perception of the ERT/L experience, the researcher asked students the following question, "Did your lecturer

present content with appropriate strategies via different technology types (e.g., live and recorded classes)" (Fathi & Yousefifard, 2019).

Chapter 3: Methodology

3.1 Introduction

As part of responding to the global need for empirically supported research dedicated to the ERT/L experience, one of the aims of this research study was to contribute to the cause of furthering HE (UNESCO, 2020a, March 10, 2020b, March 26). The study examined and explored South African students' perceptions of their ERT/L experience. Therefore, the research aimed to understand and describe ERT/L experiences from a student's perspective. In conjunction with the research purpose and goal, one can then identify student perceptions as depicting the beginning of the research journey.

More importantly, the researcher was interpreting ontological and epistemological questions based on a Post-Positivist (P-P) positioned paradigm (Creswell & Creswell, 2018). The P-P paradigm influenced every choice that was planned throughout the research cycle, from the beginning (to how the research question is asked) to the final stage (to how the research conclusion, discussion and limitations was explained) (Creswell & Creswell, 2018; Gravetter & Forzano, 2018).

Ontological questions simplify our lived reality by looking at the raw composition thereof. Willig (2013) defined ontology as "concerned with the nature of the world" (p. 12). Snape and Spencer (2003) agreed with Willig (2013) and interpreted ontology as learning what it means to be part of the nature of the world (reality). The ontological question that motivated this research study was, "What can be known about the ERT/L experience?" From a P-P-positioned paradigm, student perceptions were the answer to that question.

Epistemological questions refer to the theory of knowledge and what contributes to its conceptual construction and interpretation (Willig, 2013). According to Bryman (2008), the theory of knowledge should be "the question of what is (or should be) regarded as acceptable knowledge in a discipline" (p.13). Thereupon, the researcher asked the following epistemological question, "What was acceptable knowledge within the field of Psychology?".

Reasoning from the P-P positioned perspective; the answer determined how the researcher defined the abstract and intangible construct, in this case, student perceptions. The connection between the theory of knowledge and student perceptions was based on an operational definition of the psychological concept. The researcher has now provided concrete steps to simplify the connection.

3.2 Post-Positivist Paradigm

Creswell and Creswell (2018) averred that researchers could validly and reliably quantify a large part of the experienced world based on the P-P paradigm, given compliance with specific criteria. The P-P criteria included four assumptions that collectively uphold this worldview: determination, reductionism, empirical observational and theory verification. Fundamental to this worldview was that they shared a deterministic and reductionistic philosophy about how to know what truth and knowledge are. To understand truth and knowledge, abstract concepts need to be transformed into quantified definitions, thereby reducing the wholistic truth to a specific definition, such as student perceptions of the ERT/L experience.

Secondly, the definition of determinism provided an explanatory inference or descriptive insight into the relationship between or among the defined variables that are investigated. Ultimately, the research goal was to identify and describe explanatory and response variables.

Thirdly, these relationships or variables can be empirically observed and objectively measured, as demonstrated by the Qualtrics TPACK Survey (Fathi & Yousefifard, 2019). Finally, the outcomes of research based on these defined variables could theoretically and empirically contribute to the evolving process of theory verification. However, the research results contributed to pieces of the puzzle when understanding knowledge in its complete form (Creswell & Creswell, 2018).

A person's experience of a particular phenomenon, such as ERT/L, can be quantitatively measured, such as the person's perceptions, experiences, and attitudes. In other words, perception contributes to an epistemological interpretation of knowledge and truth from a P-P perspective. The construct (student perception) must be operationally defined (reductionistic)

within a cause-and-effect relationship (deterministic). The operationally defined construct was then quantitatively measured (third criterion) to contribute to theory development, as represented by the theory of knowledge.

The researcher quantitatively perceived the world's reality, pre-conditioned to four P-P assumptions as explained above. Based on those assumptions (Creswell & Creswell, 2018), the researcher used the P-P worldview to answer ontological and epistemological questions based on objective reality. The objective reality was, however, numerically defined, as stipulated by Christensen et al. (2015); the research data that was collected and analysed was presented in numerical form, i.e., numbers.

Given these requisites, the researcher selected an appropriate quantitative research strategy and design aligned with a quantitative procedural methodology to answer the research question (Gravetter & Forzano, 2018). Next, the researcher presented the following research steps, the sampling technique, data collection procedures, and data analysis. Lastly, ethical considerations were discussed, and an overall conclusion highlighted the main points of Chapter 3 (Methodology).

3.3 Descriptive Research Strategy

Gravetter and Forzano, (2018) said that the research strategy "is a general approach to the research determined by the kind of question that the research study hopes to answer" (p. 129). To express this differently, the research question determined the type of research strategy chosen. Aligned with the above statement, the researcher matched the research question to the correct research strategy in terms of overall purpose. Out of the five quantitative research strategies outlined in Gravetter and Forzano, (2018), the authors grouped these strategies according to three classifications, differentiated by purpose and the data type, which simplified the researcher's choice.

In the end, category one answered the research question, represented by the descriptive research strategy. What set the descriptive strategy apart from categories one and two was that category one consisted of one research strategy, making the choice even more straightforward. The advantage of the descriptive strategy was that the strategy exclusively focused on describing non-

manipulated individual variables. Non-manipulated variables are naturally occurring variables that have not been changed or altered by the researcher to answer the research question. To demonstrate, ERT/L resulted from COVID-19 and was not due to the researcher who changed the learning environment from offline F2F to ERT/L. Consequently, the researcher used the quantitative descriptive research strategy to answer the research question, "What are university students' perceptions of ERT/L at a South African University?", thus describing university student's perceptions of their ERT/L experience (Gravetter & Forzano, 2018).

The disadvantage, as Gravetter and Forzano (2018) denoted, was that the strategy does not concentrate on the relationship between either non-manipulated or manipulated variables. Consequently, the researcher could not describe or explain the relationship between variables. This meant that the researcher could not state that there was a relationship between ERT/L and student perceptions or that ERT/L was the cause of negative student perceptions.

3.4 Survey Research Design

With the research question and descriptive strategy linked up, the next decision focused on connecting the current two-piece puzzle with a third piece of the research puzzle. This part indicated the alignment of the research question to the descriptive strategy that interlocked with the correct research design (Gravetter & Forzano, 2018). Gravetter and Forzano, (2018) showed that the research design outlined how the researcher mobilised their chosen research descriptive strategy.

Generally, the researcher examined different designing aspects that included research participant requirements (individual versus group characteristics), designing conditions (homogenous or heterogenous groups) and the number of research variables (response and explanatory variables) (Gravetter & Forzano, 2018). Specific to descriptive designs and to contribute to the "how" part of the research equation, social researchers at this stage of the research process were familiar with the three main descriptive designs, as explained in Gravetter and Forzano, (2018). With the knowledge of descriptive designs, the researcher could identify different descriptive designs based on purpose, weakness and strength while simultaneously maintaining the primary research purpose. The primary research purpose was that the design purpose needed to align with the purpose governed by the research strategy.

Consequently, the researcher selected a survey research design for the following reasons. Firstly, the design has the same objective as the descriptive research strategy and aligned with the research question (Gravetter & Forzano, 2018). Secondly, the survey design was a popular instrument that has been used to collect quantitative data. To illustrate, the majority of previously discussed research articles in the literature review used the survey design to collect and analyse quantitative data (Cranfield et al., 2021; Darkwa & Antwi, 2021; Elhadary et al., 2020; Fuchs, 2021; Fuchs & Karrila, 2021; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021).

3.4.1 Disadvantages

The disadvantage of selecting a survey design, especially internet survey designs, was that they can have financial implications and representativity complications (Gravetter & Forzano, 2018). Financially, both the researcher and volunteering participants are implicated. For the researcher, internet surveys are initially expensive to construct, particularly since the researcher must buy an appropriate survey software package. Available packages include Qualtrics and SurveyMonkey which are user-friendly survey programmes used by social researchers for the primary purpose of building survey designs. Should participants have decided to volunteer, they needed a stable and reliable internet connection to complete the survey. The problem with internet access was that compared to other countries, South African mobile data is very expensive and therefore not all South Africans have access to the internet (Makumane, 2021; Matarirano et al., 2021; Songca et al., 2021a). As for sampling representative participants, the researcher did not have control over who took part and under those conditions, the collected sample could not be representative of the population the researcher targeted.

3.4.2 Advantages

When the researcher compared the survey-designed strengths to their limitations, the weight scale shifted in favor of using the internet survey design. As discussed in the advantages, the evidence emerged when the researcher combined existing survey advantages with strategies that eliminated internet survey limitations. Firstly, existing advantages included having easy access to a large cohort of volunteering participants with similar characteristics such as university students, which is an important factor for most research designs. As stipulated by Gravetter and Forzano (2018), the law of large numbers explained that there is a positive correlation between the number

of research participants and sample representativeness. Simplistically, this meant that the larger the sample size (the more volunteered participants), the more likely it was that the sampled cohort is representative of the population. Secondly, to neutralise the internet survey disadvantages, the researcher used the following techniques to eliminate financial implications and representative complications. The financial technique included using UP's Qualtrics software package and UP's free campus Wi-Fi. As a postgraduate student at UP, the university provided the researcher with access to the Qualtrics software package, eliminating initial survey construction costs.

Thirdly, to counterbalance expensive South African mobile prices, the researcher sampled all UP Psychology, Sociology and English students who had free access to the internet via UP's free campus Wi-Fi which was available to all registered university students at the time of data collection (UP, 2021).

Fourthly, one way to overcome the inability to control who completed the survey, the researcher exclusively asked only Psychology, Sociology and English UG lecturers to post the survey advert and link to the survey on their associated click-UP module announcement pages. In other words, only UG Psychology, Sociology and English students were asked to participate. This way the researcher limited internet survey access, and increased sample representativeness by sampling from the accessible population (UG university students).

Fifthly, the survey could be modified to increase user-friendliness. This was done by presenting the survey in English because English is the primary language used at UP. At the same time, the survey length was reduced to 15 minutes, which could be accessed using UP's free Wi-Fi on campus to complete the survey.

Overall, the researcher used a survey design complemented with additional techniques to overcome associating limitations, specifically an internet survey design. The intention was to use the survey design to capture a "snapshot" (p. 323) of how university students perceived their ERT/L experience as they lived through the COVID-19 pandemic (Gravetter & Forzano, 2018). The descriptive research strategy used the research survey design to answer the research

question. Therefore, the survey design allowed the researcher to describe university students' perceptions of their ERT/L experience as operationalised by their Lecturers' TPACK skills.

3.5 Non-Random Sampling

UG that had registered for their 1st, 2nd, and 3rd year in the second semester of 2022 at the Humanities Faculty from the UP were targeted. Specifically, the researcher wanted to sample approximately 100 students within the same faculty from the Psychology, Sociology and English departments. In addition, the researcher sampled volunteer research participants using a non-random sampling method. The main drawback, as explained by Gravetter and Forzano, (2018), is that non-random sampling methods increase the probability of selecting a biased sample while reducing the probability of sampling a representative sample that is prototypical to the population. From a practical perspective, it was impossible to sample the entire research population, which included all UGs from a South African University. The alternative was to sample a representative subgroup from the population so that the results from the sample could be generalised to the research population (Gravetter & Forzano, 2018).

The reason non-probability sampling methods produce biased samples was that the entire UG student population size and register (list) were unknown to the researcher. Without that, individual participant probabilities are unknown and unequal. Likewise, each participant in the UG student population did not have an equal chance (probability) of being selected or sampled. For that reason, the sampling method was regarded as biased (Gravetter & Forzano, 2018). The consequence of a biased sample was that the research project lacked external validity, which meant that the results of a research project could not be generalised across similar and related studies (Christensen et al., 2015). Using this research project as an example, the researcher acknowledged that the study had a weak population (external) validity because the research findings would not be generalised to the research population.

3.5.1 Convenience Sampling

Christensen et al. (2015) denoted that there are four non-random sampling techniques, and of the four available options, the researcher used convenience sampling because of practical limitations. Additionally, social researchers associate convenience sampling with haphazard or

accidental sampling. Regardless, the research sample included research participants who were easy to sample and participated voluntarily.

The downside to this technique is that convenience sampling is regarded as an ineffective (weak) sampling technique, increasing sampling bias and reducing sample representation concurrently (Christensen et al., 2015). However, despite these disadvantages, Gravetter and Forzano, (2018) said that the technique has some practical benefits. For one, the technique is the most prevalent sampling technique in social science research (Psychology). To emphasise the technique's popularity, many of the research articles discussed in the Literature Review (Chapter 2) used the convenient sampling method (Abou-Khalil et al., 2021; Cranfield et al., 2021; Darkwa & Antwi, 2021; Elhadary et al., 2020; Fuchs, 2021; Fuchs & Karrila, 2021; Gonzalez-Ramirez et al., 2021; Laher et al., 2021; Makumane, 2021; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021)

Other advantages Gravetter and Forzano (2018) listed included lowering research costs and assisting novice researchers with simplifying the overall sampling process. This benefit was particularly relevant, seeing that this was the researcher's first research project. Therefore, the researcher sampled participants who were available, easy to sample and volunteered to take part in the research study.

3.6 Data Collection Procedures

The study used an electronic survey to collect the data from volunteered research participants. The method safely adhered to the social distancing laws and UP already had the infrastructure for an electronic survey that could reach all registered students.

Embedded in the digital research advert, UP students accessed the invite link by either clicking once on the QR code or double-clicking on the research Uniform Resource Locator (URL) link, which redirected them to the electronic Qualtrics TPACK Survey. The survey's cover page asked UP students to read the PIS (Appendix D) and participate voluntarily by selecting either yes or no. The researcher also explained to participants that should they volunteer; their collected data would be used in the researcher's dissertation. Once the research participants understood and

agreed to volunteer, only then were they asked to fill out the survey via the Qualtrics online platform.

Depending on the participant response rate, the researcher asked the lecturers to post reminder announcements intermittently on their modules to increase participation. The idea was to remind students that their participation was appreciated and valued by the researcher.

Additional ways the researcher attempted to increase participation, included administering the survey before exams started, as most students had more free time then. Furthermore, to accommodate different student timetables, the researcher provided access to the survey for an extended period of time, approximately 45 days, affording students additional participation time. To reduce incomplete survey responses, the survey questions were kept short and simple, using everyday university language that focused on university ERT/L perceptions (Christensen et al., 2015). Lastly, the survey was pilot tested by the Supervisor and student to ensure user-friendliness from beginning to end. Fortunately, the first pilot test went as planned and that is when the Supervisor was happy to let the student proceed with the next step in the research process.

3.7 Measuring Instruments

The electronic survey consisted of five sections, namely A, B, C, D, and E, as illustrated in Appendix E: Qualtrics TPACK Survey.

3.7.1 Section A and B

Section A, as attached to Appendix D: PIS, asked UG students to read the Participant Information Sheet (PIS) that is discussed under the heading labelled : Ethical considerations that is discussed towards the end of this chapter.

Section B, Appendix E: Qualtrics TPACK Survey, of the survey asked UG students 10 demographic questions, including information on student age, student number, permission to access academic grades, major, gender, current year of study, university living residence, financial circumstances, home residence, and home language. Demographic question 3 asked

students for permission to access their academic grades, and they then answered with either option, (1) Yes or (2) No.

Demographic questions were asked to give the researcher a deeper and more comprehensive understanding of the research participants. With this information, the researcher could then describe participant characteristics that provided some background information, contributing to the primary purpose of the descriptive research strategy and research survey design. Lastly, many online survey designs, as discussed in the Literature Review (Chapter 2), included a demographic section (Abou-Khalil et al., 2021; Cranfield et al., 2021; Darkwa & Antwi, 2021; Fuchs, 2021; Fuchs & Karrila, 2021; Gonzalez-Ramirez et al., 2021; Laher et al., 2021; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021).

3.7.2 Section C and D

Section C of the survey measured student perceptions that used the adjusted version of the Student-Perceived-TPACK Scale developed and validated by Tseng (2016). To ensure that the TPACK Survey was valid and reliable, Tseng (2016) used the measurement of validity and reliability (Gravetter & Forzano, 2018), which looked at Factor Analysis, the Cronbach's Alpha Coefficient, and corrected item-total correlation. When the researcher discussed the validity of the TPACK Survey, the researcher was evaluating the degree to which the survey was measuring student perceptions (Gravetter & Forzano, 2018). At the same time, when the researcher mentioned the reliability of the TPACK Survey, the focus was on how consistent (reliable) the measurement was (Gravetter & Forzano, 2018).

Tseng's TPACK Scale has an internal consistency reliability index (Cronbach's Alpha, $\alpha = .969$). The general rule is that if a measurement scale has a coefficient of ($\alpha = .7$) and above, the scale is a reliable instrument (Bond, 2021). Therefore, Tseng's TPACK Scale is reliable for measuring student perceptions of their lecturer's TPACK skills. The TPACK Scale consists of 35 items (questions), measuring all seven of the TPACK components: CK, PK, TK, PCK, TCK, TCK and TPACK.

What was different to Tseng's Student Perceived TPACK Instrument, was that the researcher modified the Instrument in two ways. Firstly, the researcher used a six-anchored Likert Scale

(strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree) instead of applying the standardised five-anchored Likert Scale (strongly disagree, disagree, not sure, agree, strongly agree). The primary reason for doing this was that the researcher wanted to avoid student responses linked to selecting “not sure”. Therefore, the middle anchor was replaced with two additional anchors that provided the students with the options to either slightly disagree or slightly agree. To demonstrate, should the observed or sampled mean land on either strongly disagree (1), disagree (2) or slightly disagree (3), the researcher could infer that student perceptions of their lecturer’s TPACK ability was negative and therefore they were not satisfied. However, should the observed or sampled mean fall on slightly agree (4), agree (5) or strongly agree (6), the opposite is true and therefore, students are positively satisfied with their lecturer’s TPACK ability. The second changed setting was that the researcher only used 32 of the 35 original item questions (Tseng’s TPACK scale), as this was one way the researcher tried to reduce the length of the survey as much as possible by keeping students in mind as they do not enjoy lengthy or time-consuming questionnaires (Christensen et al., 2015).

Furthermore, Fathi and Yousefifard (2019) substantiated that should some of the TPACK items be removed, the removed items would not greatly influence the Cronbach Alpha values. Fortunately, based on Table 7: TPACK Instrument: Descriptive Statistics, showed that the Cronbach alpha values were all above: $\alpha = .70$, illustrating that the adjusted TPACK instrument (Qualtrics TPACK Survey) in this study had a reliable internal consistency. In other words, the items for each dimension measured the same construct.

Section D then asked students two open-ended questions. The first and second questions asked students what they liked and disliked about the primary teaching method in the first semester of 2022. Although this was a closed-ended survey with 51 quantitative student perception questions, the researcher added two qualitative questions that could also contribute to describing student perceptions during the pandemic. After all, Gillis and Krull (2020), Ramachandran and Rodriguez (2020), and Supriya et al. (2021) also constructed quantitatively dominant surveys with both closed and open-ended questions.

3.7.3 Section E

Section E of the survey also measured student perception. The researcher used a second measurement, the Importance-Performance questionnaire designed by Fuchs and Karrila (2021).

The Importance-Performance questionnaire has 10 OL attributes, measuring students' perceptions of importance and satisfaction according to each OL attribute. The difference is that students rate each attribute on two different five-point Likert Scales. The first Likert Scale ranges between "not important at all" to "extremely important" (not important at all, not very important, somewhat important, very important, and extremely important). The second Likert Scale is anchored between "Not at all satisfied" to "Extremely satisfied" (Not at all satisfied, not very satisfied, somewhat satisfied, very satisfied, and Extremely Satisfied). Another important difference is that the authors did not report the reliability of the scale, as reported by the TPACK Instrument.

3.8 Data Analysis

Once the deadline date had passed for completing the survey (end of October 2022), the researcher exported all the raw participant data from the UP Qualtrics Survey platform to the UP-research data management platform (UP, 2017a, 2017b). On this Data Management Platform, the researcher carried out the research data management procedure as outlined by UP (2017a) and UP (2017b). The procedure was like a research proposal, outlining how the researcher proposed to take complete responsibility for all the research participant data collected in the following ways. Firstly, all participant data was be stored on the Data Management Platform for 15 years (UP, 2017a, 2017b).

Secondly, student numbers were utilised to match student responses recorded on the Qualtrics dataset with marks obtained from Birap. The Statistical Package for the Social Sciences (SPSS), a statistical software programme social researchers use to describe and analyse quantitative data (Pallant, 2020). The final constructed SPSS dataset removed any identifying information, namely student numbers, and replaced them with record numbers. Once all participant data had been anonymised, the SPSS dataset was screened and cleaned as suggested by Pallant (2020), ensuring that the data was ready for analysis.

3.8.1 Closed-Ended

Closed-ended data was exported from the Excel spreadsheet and imported into SPSS. Once imported, SPSS then converted all the closed-ended questions into data that was analysed (Pallant, 2020).

3.8.2 Open-Ended

The open-ended questions presented in section D of the electronic survey was then separately analysed using a different technique, TA. Therefore, SPSS was used for the first part of the data analysis, and TA for the second part. The qualitative data used was to complement the quantitative data during data interpretations and discussions (Creswell & Clark, 2018).

3.8.3 Quantitative Analysis

The first statistical approach involved descriptive statistics that described and summarised the data; for instance, nominal data was organised into frequency distributions, whilst means and standard deviations described ordinal data (Pallant, 2020).

For the Likert student perception questions (the seven TPACK online learning constructs), the researcher used Exploratory Factor Analysis (EFA) to ensure adequate item loadings on each construct or factor. Thus, the psychometric properties, such as the Cronbach Alpha of the perceptual constructs, were determined. The scores of constructs or factors was used to make various comparisons between bio-and-demographic variables such as gender, language, and so forth. Depending on the level of categorical variables, independent sampled t-Tests or one-way Analysis Of Variance (ANOVA) was employed to determine the statistical difference between groups on the perception constructs (Pallant, 2020).

3.8.4 Thematic Analysis

TA is defined by Braun and Clarke (2006) as a popular qualitative method for analysing qualitative data. For that reason, the researcher used Braun and Clark's (2006) six steps for TA, namely, familiarising yourself with the data, generating initial codes, searching for themes, reviewing themes, defining, and naming themes and finally, producing the report. The qualitative analysis

enhanced the quantitative part of the research study. Once the final report was drafted, it was forwarded to the research supervisor for peer review.

3.9 Ethical Considerations

Research ethics and South African laws regulate research involving human research participants during the research process. Research ethics are defined by Christensen et al. (2014), "as a set of guidelines to assist the researcher in conducting ethical research" (p. 109). These principles are governed by the Health Professional Council of South Africa (HPCSA) and the Professional Board of Psychology ("Health Professional Act, No. 56 of 1974," 2006; HPCSA, 2016). Aligned with ethical committee goals, the Protection of Personal Information Act (POPIA) ensured that the researcher protected all personal research participants' information ("Protection of Personal Information Act, No. 4 of 2013," 2013). According to South African law, personal information is protected reliably and legally (Adams et al., 2021).

3.9.1 Institutional Approval and UP Gatekeepers

The researcher ensured that the research process reflected ethical and legally approved research by taking the following steps. Firstly, the researcher submitted their research proposal and additional relevant documents to the UP for institutional approval. The additional documents included the participation PIS and the consent form to be signed, requesting permission from the various authorities. Herewith, authorities referred to the three HoD within the Humanities Faculty, the UP-survey Committee and finally, the Academic Advisory Committee. Once the researcher obtained the above information, the researcher approached the gatekeepers of the research study.

When the researcher started with the sampling selection phase, they were lawfully obligated to get approval from certain gatekeepers before sampling available cohorts. Christensen et al. (2015) referred to gatekeepers as institutions or people who protect and provide access to possible research participants whom researchers have targeted for research purposes. The relevant gatekeepers in this research study included two primary gatekeepers. The first gatekeeper (UP regulations) required the researcher to get two approval letters from the following UP authorities, one letter from the Research Ethics Committee (Appendix A) and one from the Survey Committee (Appendix B).

After receiving the two approval letters, the researcher emailed each Head of Department (Psychology, Sociology and English) using UP's official website. For example, the Psychology Head of Department's email address was found on the Psychology platform by clicking on the "About us" tab. By doing that, the researcher acquired access to academic and administrative contact details. When contacting each Head of Department (HoD), the researcher introduced herself and explained the research study. Secondly, the researcher asked each HoD for permission to sample registered UG from their department who wanted to volunteer. When the HoD agreed, the researcher asked them to provide her with the contact details for either their UG coordinators or lecturers. Thirdly, attached to each HoD's email, the researcher included the following: both approval letters, the Participant Information Sheet (PIS), the research advert, and a link to the Qualtrics TPACK survey. Appendix F, G, and H provided an overview of how the researcher emailed each HoD.

With the approval from each HoD, the researcher forwarded the HoD's emailed response regarding clearance to sample research participants and contacted either the module coordinators or UG lecturers, following the same email procedure as discussed with the HoD. In the email, the researcher asked the module coordinators and lecturers to post an announcement addressed to all their module-specific UGs. The announcement asked students to participate in the research study, which was accessed using the research advert (Appendix C) or the research link uploaded on their click-UP announcement page.

3.9.2 Participant Information Sheet and Informed Consent

Secondly, should research participants have decided to volunteer, they could access the electronic survey via Qualtrics, and therefore the first thing they would have seen was the PIS and consent form. Once the participants had read the PIS, they were presented with the following statements and asked to select either option (1) No or (2) Yes:

- "I hereby give consent that my answers may be used for research purposes."
- "I understand that my information is confidential, and that no identifying information will be selected."
- "My results will form part of aggregated reporting and be anonymous."
- "I also understand that I may stop the survey at any time and may request that my data not be used."

The PIS provided complete transparency regarding the nature and purpose of the research study, as illustrated in Appendix D: providing valuable information about who the researcher was, how the participants would be protected from harm, ensuring their privacy, confidentiality and debriefing if requested.

After reading the PIS, the participants would comprehensively understand why their research participation was paramount, where and when the research would take place and what they needed to do to participate. In addition, UP UG would be aware of UP data regulations concerning the storage of data via the UP-Data Management Platform and how the researcher planned to protect their privacy and confidentiality for 15 years.

3.9.3 Voluntarily and Debriefing

Thirdly, the UP students who agreed to the research conditions proceeded to the survey questions, knowing that all research participation was voluntary. To minimise participant risk even further, the research participants knew that they could withdraw anytime without being penalised. Equally important, even if participants did not finish the survey, they would still have access to UP counselling services should they require additional assistance.

3.10 Conclusion

Above all, when reading about the researcher's methodology, the reader must understand that a perfect research methodology and method does not exist. The difference, as conceptualised by Silverman (1993), is that a researcher's methodology is about how the researcher deconstructs and investigates the research topic (student perceptions on ERT/L).

O'Sullivan et al. (2010) explained that a researcher's methodology includes the following six steps: data collection, variable measurements, sample identification, sample data collection, data analysis and research findings. As an illustration, Chapters 3, 4 and 5 can be perceived as this researcher's methodology.

Alternatively, Silverman (1993) defined a research method as a "specific research technique" (p. 1); for instance, this research study decided to use a survey research design and will analyse the data using SPSS and TA (Abutabenjeh & Jaradat, 2018).

Throughout the research process, there are advantages and disadvantages, which were previously discussed when the researcher discussed the drawbacks and benefits of the P-P paradigm, the descriptive research strategy, the survey research design, and the non-random sampling method.

Knowing that perfect research does not exist, the next best option was to appropriately connect and align each stage of the research process. When researchers do this, they guide their readers through the research journey from the beginning to the end. During the process, the researchers explain why the research question was important, how they plan to investigate the question and use the data analysis to answer the research objectives and research question. Furthermore, answering relevant questions such as who will participate, when, where, and how.

To provide one last concrete example to Chapter 3, the reader should recall how the researcher explained that the research question, "What are university students' perceptions of ERT/L at a South African University?" determined the research strategy (descriptive). Thereafter, the researcher discussed how the research design (survey) was used to answer the research question, operationalising student perceptions according to the Student Perceived TPACK Scale.

Chapter 4: The Results

4.1 Introduction

A solid theoretical knowledge base of this research project was presented in the first three chapters. As a quick reminder, Chapter 1 contextualised the research problem and explained why it is important to answer the research question for future generations, as they implicate society directly or indirectly from an educational point of view. For this reason, the following question was asked: “What are university students’ perceptions of ERT/L at a South African University?”

To assist the researcher in answering the question, seven research objectives were formed.

1. To investigate student perceptions of their lecturer’s Content Knowledge (CK) during ERT/L,
2. To analyse student perceptions of their lecturer’s Pedagogical Knowledge (PK) during ERT/L,
3. To examine student perceptions of their lecturer’s Technological Knowledge (TK) during ERT/L
4. To evaluate student perceptions of their lecturer’s Pedagogical Content Knowledge (PCK) during ERT/L
5. To understand student perceptions of their lecturer’s Technological Content Knowledge (TCK) during ERT/L
6. To inspect student perceptions of their lecturer’s Technological Pedagogical Knowledge (TPK) during ERT/L
7. To review student perceptions regarding the TPACK experience during ERT/L.

The second chapter concentrated on how other researchers were asking similar research questions while also taking notice of where and when the research took place, which produced homogenous and heterogenous results that aligned and differentiated from the academic norm defined as current academic literature. Chapter 2 was then followed by Chapter 3, drawing attention to the research question and objectives while discussing important research

characteristics such as who would be allowed to participate voluntarily, when the data would be collected and ensuring ethical processes and procedures throughout the journey. Instead of taking a theoretical stance like the previous chapters, Chapter 4 is practically orientated, reporting the research findings, and analysing the collected data. With the summarised information in Chapter 4, the following chapter (Chapter 5) will discuss the research conclusions so that the research question is answered based on empirical results.

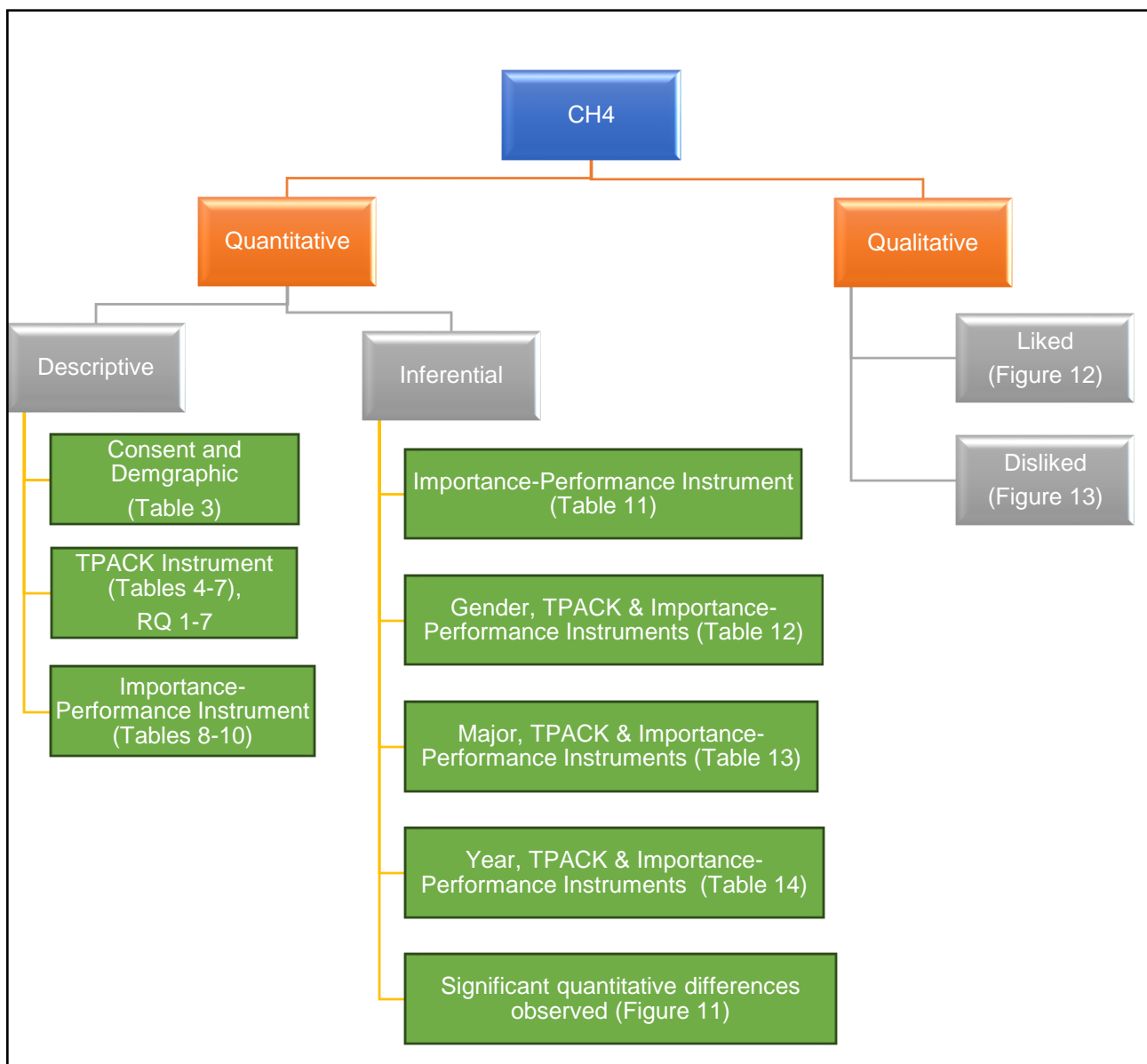
Moving from a theoretical to a practical perspective, the reader should recall from the previous chapter that the researcher used an online Qualtrics TPACK Survey for the data collection phase, which consisted of four quantitative parts and one qualitative section (Appendix E: The Qualtrics TPACK Survey). In fact, on the 1st of September, the researcher contacted three HoD's from the Humanities Faculty (Appendix F-H: Emails sent to HoD's), thereby activating the Qualtrics TPACK Survey for participation, which was open till the 31st of October 2022. Using the correct communication channels outlined in the previous chapter (Chapter 3: Methodology), Qualtrics recorded 126 surveys that included three different survey types; seven battery tested, 32 blank, and 87 answered surveys. In other words, the online survey collected a large amount of data.

During the data collection phase, (Appendix I: Quantitative Data), the first answered survey was captured on the 6th of September at 09:19:51 am, and the last case on the 29th of October at 08:09:37 am. To increase respondent participation, the research advert and survey were distributed twice during the data collection phase, with the assistance of each department, once at the beginning of September and then again on the 7th of October 2022. What could have contributed to the blank survey responses was that the Qualtrics survey settings were set up so that each respondent had to complete the survey in a single session. Should one research participant view the survey at one point in time and then complete the survey at another point in time, UP Qualtrics would have recorded two responses instead of one.

To help manage the large presentation of gathered information, Chapter 4 is divided into two main sections: Quantitative Results and Qualitative Insights. The Quantitative Results section will be further divided into two sub-sections: Descriptive Statistics and Inferential Statistics. The Descriptive Statistics Sub-Section 1 will describe the data from Qualtrics Survey Section A (Consent information), Section B (Demographic information), Section C (TPACK instrument) and

Section E (Importance/Performance Importance-Performance Instrument). While the Inferential Statistics Sub-Section 2 will look at how certain groups (gender, major and university year) compare with regards to the TPACK and Importance-Performance Instrument (Instrument and Importance-Performance Instrument). To end off Chapter 4, the researcher will conclude with Qualitative interpretations that will provide additional insight into how students perceived ERT/L during the first semester of 2022.

Figure 10
Chapter 4: Overview



4.2 Quantitative Results

4.2.1 Descriptive Statistics

With reference to Figure 10, the reader will see that the quantitative data was separated into three parts, participant consent and the demographic characteristics, TPACK Instrument (Tables 3-7 and Research Questions 1-7) and Importance-Performance Instrument (Tables 8-10).

4.2.1.1 Consent and Demographics. The online survey of section A revealed that 72 UP students gave their consent to participate voluntarily in this research study, and 15 respondents omitted to select yes or no to the consent permission question. One possibility for this was that the volunteers did not see the question because it was asked directly after the PIS as part of Section A. Since there was no way to confirm their consent, the researcher assumed that since they continued with the survey questions, they automatically consented to participate.

Regarding Section B of the Qualtrics Survey, demographic question one revealed the following age characteristics; the sample of respondents ranged between 18 years old (minimum age) and 43 years old (maximum age) with an average age of 20.57 ($SD = 2.92$, $n = 87$). Only one respondent was older than 25 years old, representing the smallest age group = 1.2% of the sample, compared to 38 UGs that were 20 and 21 years old, making up the biggest age group = 43.7% of the sample.

Moving onto the second and third demographic questions; although 82 (94%) of the respondents provided their UP-student numbers (demographic question two), only 58 (66.7%) allowed the researcher to access their academic grades (demographic question three). While five (0.06%) UGs did not list their registration numbers and 29 (33.7%) that said no to academic access.

Following the above descriptions of student-aged characteristics, UP-student numbers and academic access, the researcher will now review data outcomes of UP majors, gender, and current year. According to UG degree selections, most of the sample consisted of 44 Psychology students (50.6%), 14 English (16.1%) and 12 (13.8%) Sociology UG. There were respondents that selected neither of the three options ($n = 17$, 19.5%) and this could be because they were studying for another degree or major where either Psychology, English, and Sociology subjects

were electives and not core modules. As for the gender of the sample, there were 70 females (80.5%), and 13 males (14.5%), with two students (2.3%) who identified as Non-binary/The third Gender and two respondents (2.3%) who refrained from disclosing their identity. Moving onto UG year, the sample included 37 1st year students (42.5%), 30 2nd year (34.5%) and 20 3rd year (23.0%) students.

The last four demographic questions looked at student university living arrangements, student financial circumstances, home residence and home languages spoken. Most UGs were living at home ($n = 30$, 34.5%) or had their own flat ($n = 27$, 31.0%). Fewer students were living in a commune ($n = 17$, 19.5%) and the smallest part of the sample was located on UP residences ($n = 13$, 14.9%). A large majority ($n = 50$) of respondents said that they were financially supported by a parent/guardian (57.5%) and ($n = 33$) students had been awarded a university bursary/scholarship (37.7%). Two students explained that they worked part-time (2.3%) to support their studies, and one (1.1%) had a student loan. Additionally, of the four options provided, one respondent ($n = 1$) did not select either of the four financial options and this could be attributed to several reasons. For instance, the respondent either accidentally missed that question or chose not to disclose their financial means.

When asked, "In which province is your family from?", most of the respondents were originally from Gauteng ($n = 60$, 69.00%), whereas fewer students came from the surrounding eight provinces. Nine respondents came from KwaZulu-Natal (10.9%), six from Limpopo (6.9%), four from the Eastern Cape (4.6%) and Northwest (4.6%), two from the Western Cape (2.3%) and one each from the Free State (1.1%) and Mpumalanga (1.1%), and no students from the Northern Cape. Lastly, in descending order, it showed that this sample included 29 English (33.33%), 19 Afrikaans (21.84%), 10 IsiZulu (11.49%), eight Sepedi (9.20%), seven Sesotho (8.05%), four IsiXhosa (4.50%), four other (4.60%), three Setswana (3.45%) and three Xitsonga (3.45%) home language university speaking respondents. While the sample did not have a student whose home language was Siswati, Tshivenda or IsiNdebele.

Table 3**Demographic Information (N = 87): Descriptive Statistics**

Sample characteristics	Full sample	
	N	%
Consent		
Yes	72	82.75
No	15	17.24
Total	87	100
Age Distribution		
18-19	29	33.33
20-21	38	43.7
22-23	15	17.2
24-25	4	4.6
>25	1	1.2
Total	87	100
Student Number		
Yes	82	94.25
No	5	5.75
Total	87	100
Academic Access		
Yes	58	66.7
No	29	33.3
Total	87	100
Major		
English	14	16.1
Psychology	44	50.6
Sociology	12	13.8
Missing	-17	-19.5
Total	87	100
Gender		
Females	70	80.5
Males	13	15
Non-binary/ the third gender	2	2.3
Prefer not to say	2	2.3
Total	87	100
Current Year of Study in 2022		
1 st year	37	42.5
2 nd year	30	34.5
3 rd year	20	23
Total	87	100
University Living Residence		
Living at home	30	34.5
Had their own flat	27	31
Living in a commune	17	19.5
Living on UP Residence	13	15
Total	87	100
Financial Circumstances		
Parent/Guardian	50	57.5
University bursary/scholarship	33	38
Working part-time	2	2.3
Student Loan	1	1.1
Missing	-1	1.1

Sample characteristics	Full sample	
	N	%
Total	87	100
Home Residence		
Eastern Cape	4	4.6
Free State	1	1.1
Gauteng	60	69
KwaZulu-Natal	9	10.34
Limpopo	6	7
Mpumalanga	1	1.1
Northern Cape		
Northwest	4	4.6
Western Cape	2	2.3
Total	87	100
Home language		
Sepedi	8	9.20
Sesotho	7	8.05
Setswana	3	3.45
SiSwati		
Tshivenda		
Xitsonga	3	3.45
Afrikaans	19	21.84
English	29	33.33
IsiNdebele		
IsiXhosa	4	4.6
IsiZulu	10	11.49
Other	4	4.6
Total	87	100

Note. "Missing" demonstrates the number of students that skipped the question. For example, 17 students did not select either three of the UP Majors listed and one student did not select any of the four options provided for Financial Circumstances.

4.2.1.2 TPACK Instrument. Two measuring scales were used to quantitatively operationalise student perceptions of the ERT/L experience. The TPACK Instrument (the adjusted TPACK version) was measured in Section C of the Qualtrics TPACK Survey (Appendix E: The Qualtrics Online TPACK Survey), and Student Perceived Importance-Performance Instrument (Fuchs and Karrila's Importance-performance scale) was measured in Section E as additional information.

To demonstrate these changes and show the reader how the researcher interpreted the results, the reader should recall that the TPACK scale asked UG students to rate their lecturer's TPACK skills according to seven dimensions/subscales; TK (1), PK (2), CK (3), TPK (4), TCK (5), PCK (6) and TPCK (7). Subscale 1, 2, 3, 4 and 7 each consisted of five questions/items, replicating Tseng's original TPACK Instrument (Section C), as seen below in Table 4. Table 4 is then followed

by Tables 5 and 6 that illustrate how the researcher modified the original TPACK Instrument by reducing the number of questions for Dimensions 5 and 6. Instead of using five questions for each subscale, the researcher used three questions to measure subscale 5, and defined the 6th subscale according to four questions. The reason for mentioning this difference is that the researcher anticipated that the expected mean and observed means for Tables 4, 5 and 6 would be different from one another.

Table 4

Likert scale for the TK, PK, CK, and TPK Dimensions of the TPACK Instrument: Descriptive Statistics

Likert Scale – Questions 1 (TK), 2 (PK), 3 (CK), 4 (TPK)					
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6
5	10	15	20	25	30

Table 5

Likert scale for the TCK Dimension of the TPACK Instrument: Descriptive Statistics

Likert scale - Question 5 (TCK)					
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6
3	6	9	12	15	18

Table 6

Likert scale for the PCK Dimension of the TPACK Instrument: Descriptive Statistics

Likert Scale – Question 6 (PCK)					
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6
4	8	12	16	20	24

Table 7: TPACK Instrument: Descriptive Statistics below provides a descriptive summary of the Instrument, summarising 32 individual items, seven sub-scales, and the whole TPACK instrument (tabulating the quantitative data related to the seven research objectives). The descriptive table included the following information: sample sizes (N), central tendencies (mean, median, and mode), indicators of variabilities (minimum/maximum, standard deviation), distribution characteristics (skewness, kurtosis), normality (Kolmogorov-Smirnov) and item consistency (Cronbach Alpha). The first column shows that all the sample sizes were big enough for quantitative analysis as sample sizes ranged between $n = 52$ and $n = 58$.

Based on the measures of central tendency and distribution characteristics (skewness), the reader will see that the data was negatively skewed. Negatively skewed means that the majority of UG students fell on the right-hand side of the distribution.

According to the indicators of variability, most items and subscales ranged between strongly disagree (1) and strongly agree (6), making use of the entire Likert-scale. There were however some exceptions, for instance, the distribution with the least amount of variation included item/question 1.5, "Your lecturer answered questions related to the module to the best of their ability?", as student answers ranged from slightly disagree (3) to strongly agree (6). Alternatively, items (3.2, 4.1, 6.1, 6.2, 6.5) and subscales (1, 3, 6) ranged from disagree (2) and strongly agree (6) and subscale 4 ranged between strongly disagree (1) and agree (5).

In the second last column, the researcher documented the Kolmogorov-Smirnov test of normality (D). For interpretation purposes, one should be aware that under the null hypothesis of the Kolmogorov-Smirnov test of normality (D), the distribution is normal and that under the alternative hypothesis, the distribution is not normal. With this knowledge, the reader will notice that from a subscales' perspective, subscales 1: $D(55) = 1.43$, $p = .01$, 2: $D(57) = .13$, $p = .02$, 3: $D(56) = .14$, $p = .01$, and 7: $D(56) = .19$, $p = .00$, are not normal distributions. Whereas subscales 4: $D(55) = .11$, $p = 0.08$, 5: $D(55) = .11$, $p = .07$, and 6: $D(56) = .09$, $p = 0.20$, produced normal distributions. Furthermore, the last row of Table 7 showed that as a complete instrument (the whole instrument), the TPACK instrument had a normal distribution: $D(52) = .08$, $p = .20$. Quantitatively speaking the data failed to reject the null hypothesis and therefore the data is normally distributed. In the last

column, the Cronbach Alpha Coefficients were above $\alpha = .70$, as indicated individually and collectively, thus confirming adequate Construct Validity (Pallant, 2020).

4.2.1.2.1 Descriptives for Research Objective 1. The first research objective was formulated, “To investigate student perceptions of their lecturer’s Content Knowledge (CK) during ERT/L”. The data for CK, (Appendix I: Quantitative Data: The 7 Research Objectives) showed that 55 student answers ranged from Disagree ($n = 10$) to Strongly Agree ($n = 30$), revealing that UP students agree that their lecturer exhibited proficient CK (Mean (M) = 25.31, Medium (Me) = 25, Mode (Mo) = 25, standard deviation (SD) = 4.11).

Proficient CK was based on the five individual questions/items, where most students Agreed and Strongly Agreed that their lecturer was a module expert, with a natural teaching talent, good teaching abilities, created relevant teaching materials, and answered module related questions to the best of their abilities.

4.2.1.2.2 Descriptives for Research Objective 2. The second research objective involved analysing student perceptions of their lecturer’s Pedagogical Knowledge (PK) during ERT/L. When students were asked about their lecturer’s PK, 57 respondents either Slightly Agreed or Agreed that their lecturers illustrated adequate PK ($M = 22.93$, $Me = 23$, $Mo = 22$, $SD = 5.07$). The answers for this research objective had a minimum of Strongly Disagreeing ($n = 5$) and a maximum of Strongly Agreeing ($n = 30$).

When the researcher looked at all five questions that represent a lecturer’s PK ability, the reader will see that students were positive about the ERT/L experience. Which can be attributed to when their lecturer used a variety of teaching strategies, evaluation methods, understood student learning difficulties, accommodated student needs, and created a friendly learning environment (Appendix I: Quantitative Data: The 7 Research Objectives).

4.2.1.2.3 Descriptives for Research Objective 3. The third research objective was, “To examine student perceptions of their lecturer’s Technological Knowledge (TK) during ERT/L”. The data showed that 56 volunteers answered all five TK surveyed questions, which ranged from

Disagreeing ($n = 12$) to Strongly Agreeing ($n = 30$). The results produced the following descriptive statistics ($M = 24.85$, $Me = 25$, and a $Mo = 25$ with a $SD = 3.91$). This revealed that students were happy with their lecturer's computer skills (hardware, software skills, solving issues related to both), and remained up to date with new teaching technologies. This can be confirmed when one looks at Appendix I: Quantitative Data Appendix I: The 7 Research Objectives.

4.2.1.2.4 Descriptives for Research Objective 4. The fourth research objective focused on student perceptions of their lecturer's Pedagogical Content Knowledge (PCK) during ERT/L. Regarding their lecturer's PCK, 55 research participants Slightly Agreed that their lecturer showed adequate PCK ($M = 16.31$, $Me = 17$, $Mo = 20$, $SD = 4.79$). Student responses ranged between Disagreeing ($n = 4$) to Strongly Agreeing ($n = 24$). Upon closer examination as seen in Appendix I: Quantitative Data: The 7 Research Objectives, the reader will see the following, that many students Slightly Agreed that at the end of each lecture, they understood what was presented, had additional learning opportunities, where group activities and class discussions helped with content comprehension.

4.2.1.2.5 Descriptives for Research Objective 5. Fifthly, when students were asked about their lecturers technical and content knowledge, using the following research objective, "To understand student perceptions of their lecturer's Technological Content Knowledge (TCK) during ERT/L". Quantitative descriptive data revealed that 55 UG Agreed that their lecturer demonstrated efficient TCK abilities ($M = 14.22$, $Me = 15$, $Mo = 18$, $SD = 2.94$). As students perceived that their lecturers used technology to improve student memory, content comprehension and expand student knowledge (Appendix I: Quantitative data: The 7 Research Objectives). While student answers ranged from Strongly Disagreeing ($n = 3$) to Strongly Agreeing ($n = 18$).

4.2.1.2.6. Descriptives for Research Objective 6. The sixth research objective evaluated the following, "To inspect student perceptions of their lecturer's Technological Pedagogical Knowledge (TPK) during ERT/L". The five survey questions that measured their lecturer's TPK ability, showed that 56 respondents Slightly Agreed and Agreed that their lecturer displayed TPK ($M = 23.21$, $Me = 23.5$, $Mo = 30$, $SD = 5.13$). Student responses ranged between Strongly Disagreeing and Disagreeing ($n = 8$) to Strongly Agreeing ($n = 30$). In other words, UP lecturers used appropriate teaching technology activities to increase learning motivation,

explained difficult concepts and improved online interactions, as seen in Appendix I: Quantitative Data: The 7 Research Objectives.

4.2.1.2.7. Descriptives for Research Objective 7. The final research objective concentrated on student perceptions regarding the overall TPACK experience during ERT/L. The SPSS data as included in Appendix I: Quantitative Data: The 7 Research Objectives, showed that 56 participants agreed that their lecturers expressed proficient TPCK skills ($M = 22.89$, $Me = 25$, $Mo = 25$, $SD = 6.24$). This was based on five questions, where most students Agree that their lecturer presented content with appropriate teaching strategies via different technologies, created opportunities to practice using the correct strategies via different technologies, demonstrated their skills using appropriate strategies via different technologies, presented the module using engaging technology, and helped students with their learning. Students' answers ranged between Strongly Disagreeing and Disagreeing ($n = 7$) to Strongly Agreeing to ($n = 30$).

Table 7**TPACK Instrument: Descriptive Statistics**

	<i>N</i>	<i>M</i>	<i>Me</i>	<i>Mo</i>	<i>Mi-Mx</i>	<i>SD</i>	<i>Sk/ Std. Er</i>	<i>K/ Std. Er</i>	<i>p (D, df)</i>	<i>α</i>
Research objective 1: Content Knowledge (CK)										
1.1 Your lecturer is an expert on the module.	57	5.28	5	5	1-6	.88	-2.38/.32	9.28/.62		
1.2 Your lecturer is good at teaching the module.	57	5.04	5	6	1-6	1.15	-1.75/.32	3.79/.62		
1.3 Your lecturer has a natural teaching ability.	56	4.68	5	5	1-6	1.16	-1.35/.32	2.27/.62		
1.4 Your lecturer created teaching materials that did enhance your learning	55	4.96	5	6	1-6	1.14	-1.34/.32	1.94/.63		
1.5 Your lecturer answered questions related to the module to the best of their ability	56	5.27	5	6	3-6	.8	-.75/.32	-.30/.63		
Total Content Knowledge (CK) (5 items)	55	25.31	25	25	10-30	4.11	-1.21/.32	2.23/.63	.00 (1.43, 55)	.90
Research objective 2: Pedagogical Knowledge (PK)										
2.1 Your lecturer used a variety of teaching strategies	58	4.95	5	6	1-6	1.18	-1.30/.31	1.66/.62		
2.2 Your lecturer used different evaluation methods and techniques	58	4.40	5	5	1-6	1.39	-.59/.31	-.60/.62		
2.3 Your lecturer understood student learning difficulties	58	4.79	5	6	1-6	1.28	-.99/.31	.40/.62		
2.4 Your lecturer adjusted the way she/he taught by accommodating students according to their learning needs	57	4.05	4	4&5	1-6	1.38	-.31/.32	-.90/.62		
2.5 Your lecturer knew how to manage his/her class	57	4.81	5	5	1-6	1.14	-1.18/.32	1.60/.62		

	<i>N</i>	<i>M</i>	<i>Me</i>	<i>Mo</i>	<i>Mi-Mx</i>	<i>SD</i>	<i>Sk/Std. Er</i>	<i>K/Std. Er</i>	<i>p (D, df)</i>	<i>α</i>
Total Pedagogical Knowledge (PK) (5 items)	57	22.93	23	22	5-30	5.07	-.95/.32	1.65/.62	.02 (.13, 57).	.85
Research objective 3: Technical Knowledge (TK)										
3.1 Your lecturer knew about basic computer hardware	57	5.18	5	5	1-6	1.05	-2.35/.32	7.28/.62		
3.2 Your lecturer knew about basic computer software	57	5.30	5	6	2-6	0.84	-1.36/.32	2.62/.62		
3.3 Your lecturer knew how to solve technical problems linked to hardware issues	58	4.57	5	5	1-6	1.26	-.98/.31	.79/.62		
3.4 Your lecturer knew how to deal with technical problems related to software issues	58	4.57	5	5	1-6	1.22	-1.05/.31	1.23/.62		
3.5 Your lecturer stayed up to date with new emerging technologies	58	4.97	5	5	1-6	1.04	-1.37/.31	3.01/.62		
Total Technological Knowledge (TK) (5 items)	56	24.84	25	25	12-30	3.91	-.97/.312	1.39/.63	.01 (.14, 56)	.84
Research objective 4: PCK										
4.1 That at the end of the lecture you understood what your lecturer presented.	56	4.50	5	5	2-6	1.11	-.95/.32	.26/.63		
4.2 Your lecturer provided additional learning opportunities	56	4.61	5	5	1-6	1.33	-1.01/.32	.54/.63		
4.3 Your lecturer used group activities to help you learn the module content better	55	3.15	3	2	1-6	1.79	.42/.32	-1.27/.63		
4.4 Your lecturer used class discussions to improve your understanding	56	4.14	5	5	1-6	1.61	-.59/.32	-.92/.63		
Total Pedagogical Content Knowledge (PCK) (4 items)	55	16.31	17	20	6-24	4.79	-.32/.32	-.84/.63	.08 (.11, 55)	.82
Research objective 5: TCK										

	<i>N</i>	<i>M</i>	<i>Me</i>	<i>Mo</i>	<i>Mi-Mx</i>	<i>SD</i>	<i>Sk/Std. Er</i>	<i>K/Std. Er</i>	<i>p (D, df)</i>	<i>α</i>
5.1 Your lecturer used technology that helped you remember the module content better	56	4.82	5	6	1-6	1.15	-.92/.32	1.02/.63		
5.2 Your lecturer used technology to help you understand the module content better	55	4.84	5	5	1-6	.96	-1.24/.32	3.47/.63		
5.3 Your lecturer used technology that expanded your insight regarding the module content	55	4.56	5	5	1-6	1.18	-.82/.32	.45/.63		
Total Technological Content Knowledge (TCK) (3 items)	55	14.22	15	18	3-18	2.94	-1.02/.32	2.41/.63	.07 (.11, 55)	.87
Research objective 6: TPK										
6.1 Your lecturer used technology to motivate you to learn	56	4.73	5	6	2-6	1.26	-.84/.32	-.196/.63		
6.2 Your lecturer used technology to explain difficult concepts clearly	56	4.80	5	4	2-6	1.03	-.61/.32	.14/.63		
6.3 Your lecturer used interactive technology to interact more with you and other students	56	4.54	5	5	1-6	1.36	-1.15/.32	1.11/.63		
6.4 Your lecturer used technology to improve their teaching activities	56	4.32	5	5	1-6	1.54	-.82/.32	-.33/.63		
6.5 Your lecturer used technology that was appropriate for his/her teaching.	56	4.82	5	5	2-6	1.1	-1.00/.32	.60/.63		
Total Technological Pedagogical Content Knowledge (TPK) (5 items)	56	23.21	23.5	30	8-30	5.13	-.58/.32	.330/.63	.20 (.09, 56)	.87
Research objective 7: TPACK										
7.1 Your lecturer presented content with appropriate strategies via different technology types	56	4.88	5	6	1-6	1.25	-1.14/.32	.76/.63		
7.2 Your lecturer provided you with the opportunity to practice what you learned with appropriate strategies via different technologies	56	4.71	5	6	1-6	1.41	-1.12/.32	.40/.63		

	<i>N</i>	<i>M</i>	<i>Me</i>	<i>Mo</i>	<i>Mi-Mx</i>	<i>SD</i>	<i>Sk/Std. Er</i>	<i>K/Std. Er</i>	<i>p</i> (<i>D, df</i>)	α
7.3 Your lecture provided you with the opportunity to demonstrate your skills with appropriate strategies via different technologies	56	4.61	5	5	1-6	1.37	-1.00/.32	.37/.63		
7.4 The way your lecturer presented the module using technology was engaging	56	4.39	5	5	1-6	1.52	-.80/.32	-.45/.63		
7.5 The way your lecturer presented the module content using technology helped you with your learning.	56	4.30	5	5&6	1-6	1.51	-.57/.32	-.81/.63		
Total Technological Pedagogical Content Knowledge (TPCK) (5 items)	56	22.89	25	25	7-30	6.24	-.82/.32	-.30/.63	.00 (.19, 56).	.93
Total TPACK scale /Instrument (32 items)	52	148.87	152	Multiple Mo	76-192	26.91	-.42/.33	-.33/.65	.20 (.08, 52)	.96

Note. *N* = Sample size, *M* = Mean, *Me* = Median, *Mo* = Mode, *Mi-Mx* = Minimum to Maximum range, *SD* = Standard deviation, *Sk/Std. Er* = Skewness/ Standard Error, *K/Std. Er* = Kurtosis/ Standard Error, *p* (*D, df*) = The probability of significance (Kolmogorov-Smirnov test, degrees of freedom) was set at .05 (*p* is significant at <.05), α = Cronbach Alpha and *Multiple Mo* = Multiple modes exist.

4.2.1.3 Importance-Performance Instrument. Previously, the researcher tabulated and discussed the descriptive statistics for TPACK Instrument. One big difference between the first and second Student Perceived Instrument is that the second instrument (Importance-Performance Instrument) consisted of two subscales that included 10 items each whereas the first instrument (TPACK Instrument) had seven subscales with three/four/five items for each subscale. Using the same procedure, the researcher will now present the tabulated results of Table 8 (on the next page) for Importance-Performance Instrument.

In the last column of Table 8, the data showed that subscales 1, 2, and the whole instrument measured the same construct, generating the following Cronbach Alpha values, the first 10 items: $\alpha = .74$, second 10 items: $\alpha = .89$, two items combined: $\alpha = .87$. In the second last column of Table 8, the Kolmogorov-Smirnov test of normality (D) revealed the following: that subscale 1 (the first 10 items) did not have a normal distribution $D(52) = .15$, $p = .00$, and therefore the null hypothesis was rejected. Whereas subscale 2 as represented by the second 10 items: $D(53) = .110$, $p = .16$, and as a whole instrument composed of 20 items: $D(51) = .09$, $p = .20$, both generated normal distributions and as a result, failed to reject the null hypothesis.

With regards to sample size, central tendencies and distribution characteristics, the results of the second instrument aligned with that of the first. The sample sizes were large enough for quantitative analysis, producing negatively skewed data.

However, despite the similarities, when it came to indicators of variability, Importance-Performance Instrument generated a wider range of distributions. On the one hand, like TPACK Instrument, Importance-Performance Instrument included three types of distributions, those that ranged between a minimum of one and a maximum of five (items 2.1, 2.2, 2.3, 2.8, 2.10) or started at a minimum of two and ended at a maximum of five (items 1.1, 1.8, 1.9, 1.10, 2.4-2.6, 2.9, Total subscale 2) or had a minimum of three and a maximum of five (items 1.5, 1.6, 1.7, Total subscale 1). On the other hand, unlike TPACK Instrument, Importance-Performance Instrument included a fourth distributional type that ranged between four and five (Items 1.2 - 1.4), illustrating a distribution with the smallest's variation.

Table 8

Importance-Performance Instrument: Descriptive Statistics

	<i>N</i>	<i>M</i>	<i>Me</i>	<i>Mo</i>	<i>Mi-Mx</i>	<i>SD</i>	<i>Skew/ Std Err</i>	<i>Kurt/ Std Err</i>	<i>P (D, df)</i>	<i>α</i>
Subscale 1: Importance										
1.1 The lecturer begins the class with a review of the previous one.	53	3.85	4	5	2-5	1.05	-.32/.33	-1.17/.64		
1.2 The lecturer presents the material in an interesting and engaging way	53	4.74	5	5	4-5	.45	-1.1/.33	-.82/.64		
1.3 The lecturer presents the material in an organized and coherent way.	53	4.79	5	5	4-5	.41	-1.49/.33	.21/.64		
1.4 The lecturer is friendly and patient with the students.	53	4.79	5	5	4-5	.41	-1.49/.33	.21/.64		
1.5 The lecturer is friendly and patient with the students.	53	4.47	5	5	3-5	.7	-.96/.33	-.30/.64		
1.6 The course material is well and professional prepared.	53	4.70	5	5	3-5	.50	-1.35/.33	.84/.64		
1.7. The course material is easy to access in the Learning Management System (Click UP).	52	4.65	5	5	3-5	.56	-1.36/.33	.98/.65		
1.8. Students are engaged to actively participate in the discussion.	53	3.87	4	5	2-5	1.02	-.29/.33	-1.16/.64		
1.9. I am learning something which I consider valuable.	53	4.66	5	5	2-5	.586	-2.15/.33	6.57/.64		
10. I am finding the course challenging and stimulating.	53	4.06	4	4a	2-5	.842	-.31/.33	-1.01/.64		
Total subscale 1: Importance (10 items)	52	44.52	45.50	46	36-50	3.78	-.45/.33	-.57/.65	.00 (.15, 52)	.74

	<i>N</i>	<i>M</i>	<i>Me</i>	<i>Mo</i>	<i>Mi-Mx</i>	<i>SD</i>	<i>Skew/Std Err</i>	<i>Kurt/Std Err</i>	<i>P (D, df)</i>	<i>α</i>
Subscale 1: Performance										
2.1. The lecturer begins the class with a review of the previous one.	54	3.46	4	4	1-5	1.21	-.71/.33	-.23/.64		
2.2. The lecturer presents the material in an interesting and engaging way.	54	3.61	3.50	3	1-5	1.07	-.30/.33	-.37/.64		
2.3. The lecturer presents the material in an organized and coherent way.	53	4.02	4	5	1-5	.99	-.78/.33	.181/.644		
2.4. The lecturer is knowledgeable about the content and material of the course.	54	4.37	4	4a	2-5	.68	-.99/.33	1.39/.64		
2.5. The lecturer is friendly and patient with the students.	54	3.93	4	4	2-5	.89	-.36/.33	-.69/.64		
2.6. The course material is well and professionally prepared.	54	4.19	4	4a	2-5	.83	-.78/.33	.05/.64		
2.7. The course material is easy to access in the Learning Management System (Click UP).	54	4.22	4	5	2-5	.86	-1.01/.33	.48/.64		
2.8. Students are engaged to actively participate in the discussion.	54	3.50	4	4	1-5	1.04	-.21/.33	-.71/.64		
2.9. I am learning something which I consider valuable.	54	4.19	4	5	2-5	.80	-.58/.33	-.52/.64		
2.10. I am finding the course challenging and stimulating.	54	3.96	4	4	1-5	.91	-.70/.33	.63/.64		
Total subscale 2: Performance (10 items)	53	39.26	40	40	22-50	6.69	-.33/.33	-.49/.64	.16 (.11, 53)	.89
Total Importance/performance scale (20 items)	51	83.61	85	79a	66-100	8.78	-.16/.33	-.79/.66	.20 (.1, 51)	.87

Note. N = sample size, M = Mean, Me = Median, Mo = Mode, Mi-Mx = Minimum to Maximum range, SD = Standard deviation, Sk/Std.Er = Skewness/ Standard Error, K/Std.Er = Kurtosis/

Standard Error, p (D, df) = The probability of significance (Kolmogorov-Smirnov test, degrees of freedom) was set at .05 (p is significant at <.05) and α = Cronbach Alpha.

Equally important to notice is the following: UP students perceived certain ERT/L online elements as more important than others. Below, Table 9 summarises the average mean (M) and individual means for each of the ERT/L attributes that made up the first subscale (Importance). The data produced a mean minimum of ($M = 3.85$, last column in Table 9) and a mean maximum of ($M = 4.79$, first column in Table 9), where seven of 10 ERT/L attributes positioned above the average mean and three falling below the average mean ($M = 4.46$). In terms of important OL ERT/L attributes, UP students selected attributes 3 (A3), “The teacher presents the material in an organised and coherent way” ($M = 4.79$, $SD = .409$), and A4, “The teacher is knowledgeable about the content and material of the course” ($M = 4.79$, $SD = .409$), as the most important OL attributes during ERT/L. The third and fourth important attributes were, attributes A2, “The teacher presents the material in an interesting and engaging way” ($M = 4.74$, $SD = .445$) and A6, “The course material is well and professionally prepared” ($M = 4.7$, $SD = .503$). Whereas, to the right of Table 9, it shows that students rated ERT/L attribute A1, “The teacher begins the class with a review of the previous class” ($M = 3.85$, $SD = 1.05$) and A8, “Students are engaged to actively participate in the discussion” ($M = 3.87$, $SD = 1.02$) as the least important OL elements.

Table 9

Importance-Performance Instrument: Subscale 1: Descriptive Statistics

A3 (Maximum)	A4	A2	A6	A9	A7	A5	A10	A8	A1 (Minimum)
4.79	4.79	4.74	4.7	4.66	4.65	4.47	4.06	3.87	3.85

Note. Average Mean (M) = 4.46. A_i = Attribute.

A3 = The teacher presents the material in an organised and coherent way.

A4 = The teacher is knowledgeable about the content and material of the course.

A2 = The teacher presents the material in an interesting and engaging way.

A6 = The course material is well and professionally prepared.

A9 = I am learning something which I consider valuable.

A7 = The course material is easy to access in the Learning Management System (Click UP).

A5 = The lecturer is friendly and patient with the students.

A10 = I am finding the course challenging and stimulating.

A8 = Students are engaged to actively participate in the discussion.

A1 = The teacher begins the class with a review of the previous class.

Using the same layout but a different construct (Satisfaction/ Performance), the average mean rating for the second subscale ($M = 3.95$) was bounded between the upper bound of ($M = 4.37$, maximum/ attribute four = A4) and the lower bound of ($M = 3.46$, minimum/ attribute one = A1) as seen in Table 10: Importance-Performance Instrument: Subscale 2: Descriptive Statistics. Between these boundaries and surrounding the average mean, six attributes were above the average, and four below. Regarding Satisfaction/ Performance, in descending order, UP students were the most satisfied with their lecturer's fourth attribute (A4): "The lecturer is knowledgeable about the content and material of the course" ($M = 4.37$, $SD = .681$), seventh attribute: A7, "The course material is easy to access in the Learning Management System" ($M = 4.22$, $SD = .861$), sixth attribute (A6): "The course material is well and professionally prepared", ($M = 4.19$, $SD = .83$) and Ninth attribute (A9): "I am learning something which I consider valuable" ($M = 4.19$, $SD = .80$). On the other hand, in ascending order, students were the least satisfied with the first attribute (A1): "The teacher begins the class with a review of the previous class" ($M = 3.46$, $SD = 1.21$) and eighth attribute (A8): "Students are engaged to actively participate in the discussion" ($M = 3.50$, $SD = 1.04$).

Table 10
Importance-Performance Instrument: Subscale 2: Descriptive Statistics

A4 (Maximum)	A7	A6	A9	A3	A10	A5	A2	A8	A1 (Minimum)
4.37	4.22	4.19	4.19	4.02	3.96	3.93	3.61	3.50	3.46

Note. Average Mean (M) = 3.95

A4 = The teacher is knowledgeable about the content and material of the course.

A7 = The course material is easy to access in the Learning Management System (Click UP).

A6 = The course material is well and professionally prepared.

A9 = I am learning something which I consider valuable.

A3 = The teacher presents the material in an organised and coherent way.

A10 = I am finding the course challenging and stimulating.

A5 = The lecturer is friendly and patient with the students.

A2 = The teacher presents the material in an interesting and engaging way.

A8 = Students are engaged to actively participate in the discussion.

A1 = The teacher begins the class with a review of the previous class.

4.2.2 Inferential Statistics

In the first half of the quantitative analysis, the researcher discussed and described all the quantitative descriptive statistics in relation to the Qualtrics TPACK Survey. The second half is now presented, covering the inferential statistics. Consistent with the structure used in the first half (which included three sections), the second half consists of four sections. With reference to Figure 10 as presented at the beginning of this chapter, one will see that the inferential section starts with a paired sampled t-test, that compares the first 10 OL attributes (in terms of Importance) with the second 10 OL attributes (in relation to Performance) of the Importance-Performance Instrument.

After discussing the results of the paired sampled t-test, the second inferential section will then review the results of two independent t-tests used to evaluate the relationship between gender, the TPACK Instrument and the Importance-Performance Instrument. The third and fourth inferential sections, will then discuss the outcomes of an ANOVA test that compares three different UG majors (English, Psychology and Sociology departments), followed by the Current year of study (1st, 2nd and 3rd years) on both the TPACK Instrument and Importance-Performance Instrument that operationalised student perception.

4.2.2.1 Importance-Performance Instrument. Even though this research study is only describing variables, it is worth mentioning that the Importance-Performance Instrument produced significant differences (when analysed using the paired sampled t-test), as outlined below in Table 11: Importance-Performance Instrument: Inferential Statistics. Individually, from A2 to A9, the mean values for the first and second sub-scale differentiated greatly from one another. As a whole instrument, subscale one and subscale two of the Importance-Performance Instrument also deviated significantly from one another. While attribute one (A1): “The teacher begins the class with a review of the previous class” and attribute ten (A10): “I am finding the course challenging and stimulating”, as measured by Importance (Subscale 1) and Satisfaction (Subscale 2) were homogenous.

Table 11***Importance-Performance Instrument: Inferential Statistics***

Attribute sequence (A _i)	Attribute Description	Importance		Performance		Paired Sampled T-test		
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
A1	The teacher begins the class with a review of the previous class.	3.85	1.05	3.68	1.21	52	1.98	.05
A2	The teacher presents the material in an interesting and engaging way.	4.74	.45	3.61	1.07	52	6.81	.00
A3	The teacher presents the material in an organised and coherent way.	4.79	.41	4.02	.99	51	5.15	.00
A4	The teacher is knowledgeable about the content and material of the course.	4.79	.41	4.37	.68	52	4.23	.00
A5	The teacher is friendly and patient with the students.	4.47	.70	3.39	.87	52	4.13	.00
A6	The course material is well and professionally prepared.	4.70	.50	4.19	.86	52	4.27	.00
A7	The course material is easy to access in the Learning Management System.	4.65	.56	4.22	.86	51	3.36	.00
A8	Students are engaged to actively participate in the discussion.	3.89	1.00	3.50	1.04	52	2.43	.02
A9	I am learning something which I consider valuable.	4.66	.59	4.19	.80	52	4.43	.00
A10	I am finding the course challenging and stimulating.	4.06	.84	3.96	.91	52	.51	.61
Total Importance/Total Satisfaction		44.41	3.73	39.20	6.74	50	5.77	.00

Note . *p* = The probability of significance (Kolmogorov-Smirnov test) was set at .05 (*p* is significant at <.05).

4.2.2.2 Gender, TPACK and Importance-Performance Instruments. Several independent sampled t-tests were conducted to compare the TPACK Instrument and Importance-Performance Instruments' scores for males and females (gender). Below, Table 12: Gender, TPACK and Importance-Performance Instruments: Inferential Statistics, provides a summary of nine subscale t-tests (seven subscales from TPACK Instrument and two subscales from Importance-Performance Instrument) and two complete instrument t-tests.

The first feature that stood out, is that the number of female respondents outnumbered the males on both TPACK and Importance-Performance Instruments. Regardless of the uneven ratio of gendered students, the Leven's Test for Equality of Variances (F) determined that equal variances can be assumed across corresponding subscales and for TPACK Instrument: $F = 1.643$, $p = .206$, and Importance-Performance Instrument: $F = .042$, $p = .839$. In other words, the distributional range of scores for females and males were the same.

Table 12

Gender, TPACK and Importance-Performance Instruments: Inferential Statistics

Variable	Male			Female			Mean Difference	95% CI	df	t	p	Partial Eta Difference (ηp)
	n	M	SD	N	M	SD						
TPACK Instrument												
T_CK	11	25.64	2.83	41	25.29	4.41	.34	-2.49, 3.17	50	.24	.81	.00
T_PK	11	22.55	3.93	43	23.19	5.24	-.64	-4.04, 2.76	52	-.38	.71	.00
T_TK	11	25	2.79	42	25.02	3.95	-.02	-2.57, 2.53	51	-.02	.99	.00
T_PCK	11	16.46	4.44	41	16.42	4.74	.04	-3.15, 3.23	50	.03	.98	.00
T_TCK	11	14.18	2.09	41	14.32	3.07	-.14	-2.11, 1.84	50	-.14	.89	.00
T_TPK	11	22.18	4.47	42	23.52	5.27	-1.34	-4.83, 2.14	51	-.77	.44	.01
T_TPCK	11	23.46	5.07	42	22.81	6.62	.65	-3.67, 4.96	51	.30	.77	.00
Total TPACK	11	149.46	21.72	38	149.50	27.54	.05	18.24, 18.15	47	-.01	.99	.00
Importance-Performance Instrument												
Importance	11	43.91	4.16	39	44.62	3.72	-.706	-3.33, 1.92	48	-.54	.59	.00
Performance	11	39.45	6.49	40	39.25	6.88	.205	-4.45, 4.86	49	.09	.93	.00
Importance Performance	11	83.36	9.99	38	83.63	8.55	-.27	-6.38, 5.85	47	-.09	.93	.00

Note . p = The probability of significance (Kolmogorov-Smirnov test) was set at .05 (p is significant at <.05)

4.2.2.3 UG Major, TPACK and Importance-Performance Instruments. Previously, the researcher used a paired sampled t-test to compare OL attributes and an independent sampled t-test that compared the relationship between gender and both instruments (TPACK Instrument and Importance-Performance Instrument). Instead of dividing the sample into two groups (males and females = independent t-test), the researcher used another statistical process called ANOVA, that allowed the researcher to divide the sample into three groups (three types of UG Majors). With three defined groups, one can determine if there was a relationship between the three types of UG Majors on both Student Perception Instruments (the TPACK Instrument and Importance-Performance Instrument).

To investigate the relationship between three UG Major types and the two Instruments (TPACK and Importance-Performance), the researcher analysed the results of several one-way between groups of analysis of variance using both subscales and instruments (Table 13, as seen below). As such, the sampled cohort was broken into three groups as defined by the student's UG Major (Group 1: English Department, Group 2: Psychology Department, Group 3: Sociology Department).

Consistent with the first and second observed patterns as discussed earlier (Gender, TPACK and Importance-Performance Instruments), unequal sample sizes did not affect the group variances. For example, eight English, 27 Psychology and nine Sociology students completed the TPACK Instrument with the following results for the Test of Homogeneity of Variances: $F(2,41) = 2.019$, $p = .146$ and ANOVA: $F(2, 43) = .755$, $p = .476$. While eight English, 30 Psychology and five Sociology UG filled in the Importance-Performance Instrument: $F(2, 40) = 2.629$, $p = .085$. Confirming the assumption of homogeneity of variances, the scores recorded for all three UG Majors were not different according to nine subscales or two instruments. Secondly, there were no significant differences detected for the nine subscales and two instruments. For that reason, the researcher concluded that the type of UG Major did not influence the outcome on either TPACK Instrument or Importance-Performance Instrument

Table 13

UG Major, TPACK and Importance-Performance Instruments: Inferential Statistics

Variable	English Department			Psychology Department			Sociology Department			Df	F	P	Partial Eta squared (η^2)
	N	M	SD	N	M	SD	n	M	SD				
TPACK Instrument													
T_CK	8	27	2.33	29	24.59	4.65	10	25.1	3.78	2, 46	1.04	.36	.05
T_PK	9	24.78	3.07	29	22.38	5.12	10	24.20	4.26	2, 47	1.20	.31	.05
T_TK	9	26.67	2.12	29	24.59	4.54	10	24.50	3.95	2, 47	.97	.39	.04
T_PCK	8	16.38	3.74	30	15.73	5.13	9	17.89	3.89	2, 46	.73	.49	.03
T_TCK	9	14.89	2.67	29	13.93	3.38	9	14.00	2.29	2, 46	.34	.71	.02
T_TPK	9	25.33	4.56	29	22.03	5.43	10	24.00	4.22	2, 47	1.68	.20	.07
T_TPCK	9	24.22	4.44	30	22.67	6.47	9	23.56	5.64	2, 47	.26	.77	.01
Total TPACK	8	156.50	18.05	27	144.56	29.70	9	153.00	8.35	2, 43	.76	.48	.04
Importance-Performance Instrument													
Importance	8	45.00	3.02	30	43.80	4.15	6	45.33	4.03	2, 43	0.57	.56	.03
Performance (Satisfaction)	9	43.33	3.28	30	37.70	6.97	6	41.67	7.50	2, 44	3.04	.06	.13
Importance/Performance	8	88.00	4.50	30	81.50	9.06	5	87.20	11.39	2, 42	2.30	.11	.10

Note . p = The probability of significance (Kolmogorov-Smirnov test) was set at .05 (p is significant at $< .05$).

4.2.2.4 Current Year of Study, TPACK and Importance-Performance Instruments. In the first three sections of reviewing the inferential outcomes associated OL attributes (paired sample t-test) and Gender versus TPACK Instrument and Importance-Performance Instrument (independent sampled t-test analysis) and then Major versus both instruments (ANOVA results), the data showed that: There are significant differences between OL attributes, however neither Gender nor the type of UG Major influenced the TPACK Instrument and Importance-Performance Instrument. However, when the researcher used AVOVA to compare 1st, 2nd, and 3rd year students to the same two instruments, similar and distinctive trends emerged.

Like the previous results related to the independent t-tests (Gender, TPACK and Importance-Performance Instruments) and ANOVA (UG Major, TPACK and Importance-Performance Instrument), all three statistical tests (t-test one, ANOVA test one and ANOVA test two) showed that the groups statistics were unequal even though variances for individual groups-maintained homogeneity. Herewith ANOVA test two refers to the second ANOVA analysis, that was used to compare currents Year of Study to both Instruments (TPACK and Importance-Performance Instruments).

Unlike previous outcomes for the independent t-test and ANOVA test 1 (insignificant differences), the fourth inferential test (ANOVA test 2) uncovered significant variations. Table 14 below shows that there are polarities between the 1st, 2nd, and 3rd year students from a sub-sale point of view and as an entire Instrument, like the TPACK Instrument and Importance-Performance Instrument. As such, significant differences (deviations) were identified on a subscales level and as a whole/complete Instrument on both measurements (TPACK and Importance-Performance Instrument).

After ANOVA test 2 (the 4th statistical test) confirmed that there were heterogenous results (significant incompatibilities), the researcher used another inferential test called the POST HOC Test (Tukey HSD) that located exactly where the significant difference is, either between the 1st and 2nd years, or 1st and 3rd years or 2nd and 3rd years.

Looking at the outcomes related to TPACK Instrument as seen below in Table 14: Current Year of Study, TPACK and Importance-Performance Instruments: Inferential Statistics and Figure 11:

Significant quantitative differences observed, one can see the following. The first observed difference was that 1st and 2nd year students deviated significantly from one another from both a subscales perspective and as a complete Instrument. This was based on the SPSS output (Inferential Statistics Instrument One and Instrument Two), looking at the table called Multiple Comparisons, under the heading POST Hoc Tests results. Alternatively, the reader can refer to Figure 11 (a), T_CK ($M1$ (Mean for the 1st year cohort) = 26.75 and $M2$ (Mean for the 2^d year cohort) = 23.68, $p = .038$), Figure 11(b), T_PCK ($M1 = 18.72$, $M2 = 14.05$, $p = .002$), Figure 11(c), T_TCK ($M1 = 15.38$, $M2 = 13.16$, $p = .034$), T_TPK ($M1 = 25.46$, $M2 = 20.58$, $p = .004$) and as an entire TPACK instrument ($M1 = 162.57$, $M2 = 135.33$, $p = .002$).

The second important difference with regards to TPACK Instrument, is that subscale 4 (PCK) showed that not only do 1st and 2nd years differ significantly from one another, but 1st years also deviate greatly from 3rd year students ($M1 = 18.72$, $M3 = 14.73$, $p = .036$) too (as seen below in Table 14 (4th row), Figure 11 (b) or SPSS output).

The Importance-Performance Instrument also provided quantifiable evidence (Figure 11 (f-g), Table 14 or SPSS output: Inferential Statistics Instrument Two), like the first instrument, that noticeable inconsistencies were also evident from both an individual subscale, total satisfaction: $M1 = 41.30$, $M2 = 35.94$, $p = .030$, Figure 11(f)) and an entire measurement point of view (Importance-Performance Instrument : $M1 = 86.48$, $M2 = 79.29$, $p = .030$, Figure 11 (g)). Thus, a second shared feature was that heterogeneous outcomes in the second instrument were also identified between 1st year and 2nd year cohorts.

Table 14

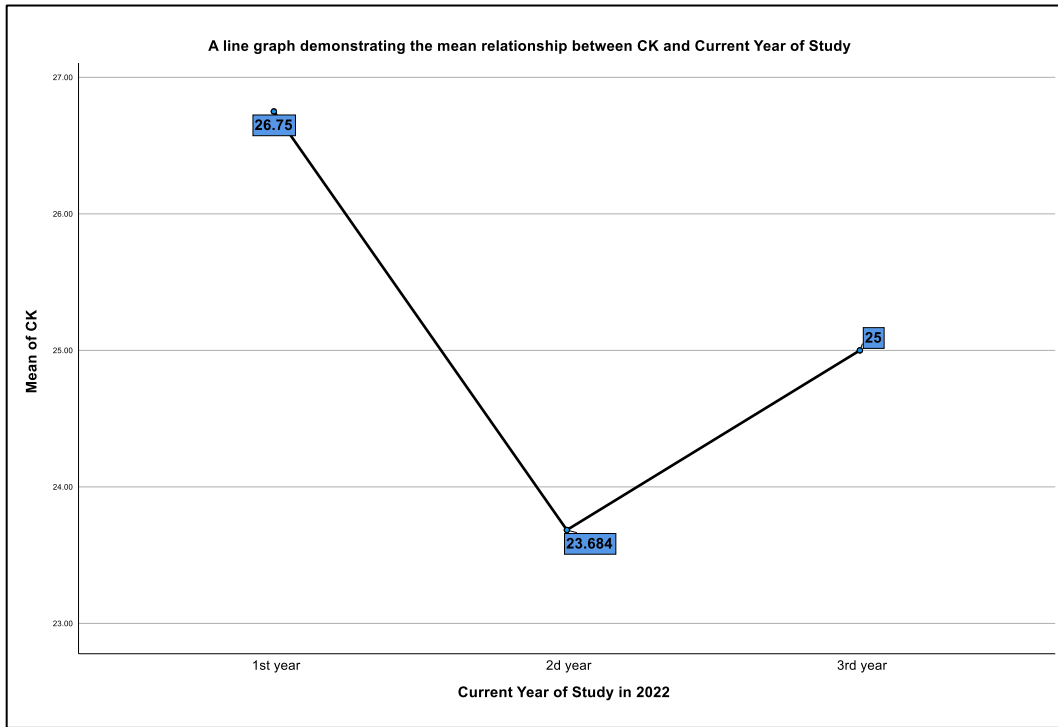
Current Year of Study, TPACK and Importance-Performance Instruments: Inferential Statistics

Variable	1 st year			2 nd year			3 rd year			Df	F	P	Partial Eta squared (ηp^2)
	n	M	SD	n	M	SD	n	M	SD				
TPACK Instrument													
T_CK	24	26.75	3.11	19	23.68	3.89	12	25.00	5.38	2, 54	3.24	.05	.11
T_PK	25	24.20	5.31	19	21.00	4.80	13	23.31	4.42	2, 56	2.30	.11	.08
T_TK	25	26	3.06	18	23.17	4.89	13	24.92	3.25	2, 55	2.94	.06	.10
T_PCK	25	18.72	3.76	19	14.05	4.74	11	14.73	4.76	2, 54	7.22	.00	.22
T_TCK	24	15.38	2.06	19	13.16	2.41	12	13.58	4.34	2, 54	3.71	.03	.13
T_TPK	24	25.46	4.22	19	20.58	4.03	13	22.93	6.38	2, 55	5.65	.01	.18
T_TPCK	25	25.24	5.21	19	20.89	6.02	12	21.17	7.33	2, 55	3.49	.04	.12
Total TPACK	23	162.57	22.12	18	135.33	23.28	11	142.36	29.79	2, 51	6.86	.00	.22
Importance-Performance Instrument													
Importance	22	45.36	4.03	17	43.35	3.32	12	44.62	3.78	2, 51	1.39	.26	.05
Performance (Satisfaction)	23	41.30	6.35	17	35.94	5.72	13	40.00	7.22	2, 52	3.57	.04	.13
Total Importance/Performance	21	86.48	9.05	17	79.29	7.51	13	84.62	8.21	2, 50	3.60	.04	.13

Note. The effect size of the Partial Eta Squared (ηp^2) is categorised into three levels (small, medium, and large effects sizes). Using Cohen's classification system, $\eta p^2 = .01$, is labelled as a small effect size, where a medium effect size would produce, $\eta p^2 = .06$, and $\eta p^2 = .14$ would be understood as producing a large effect.

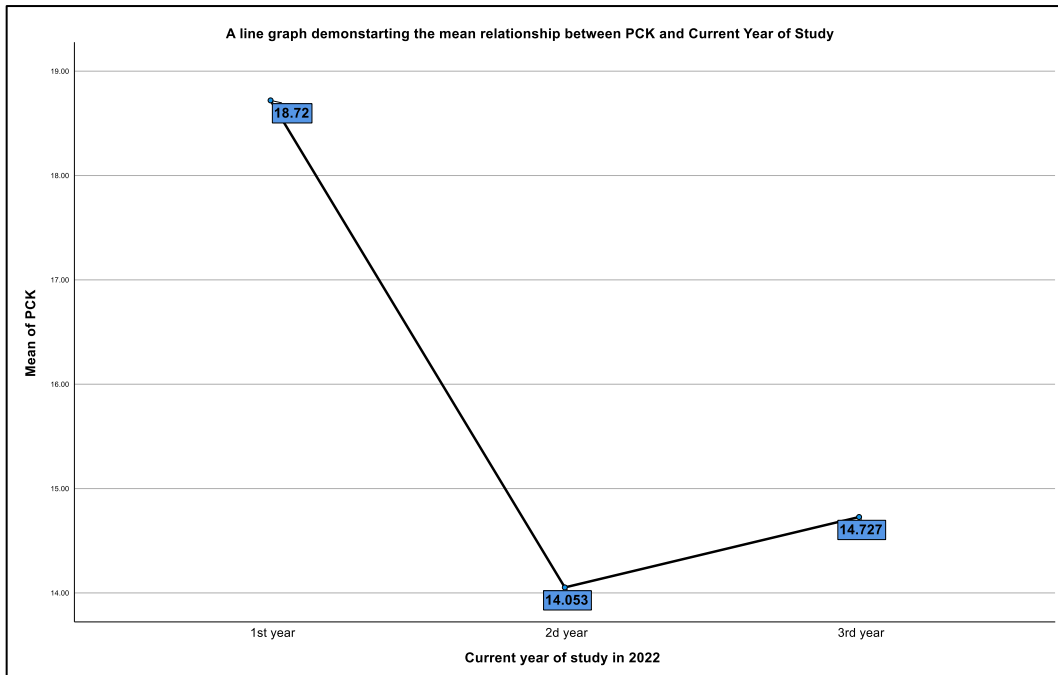
Figure 11

Significant quantitative differences observed



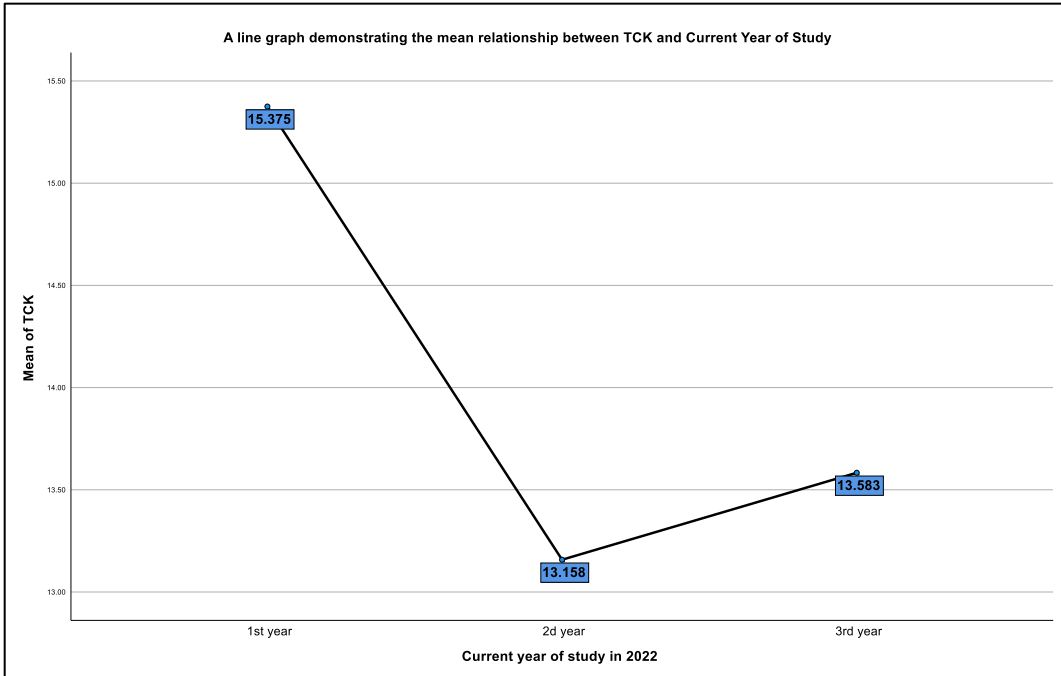
(a)

Note. CK = Subscale of the TPACK instrument.



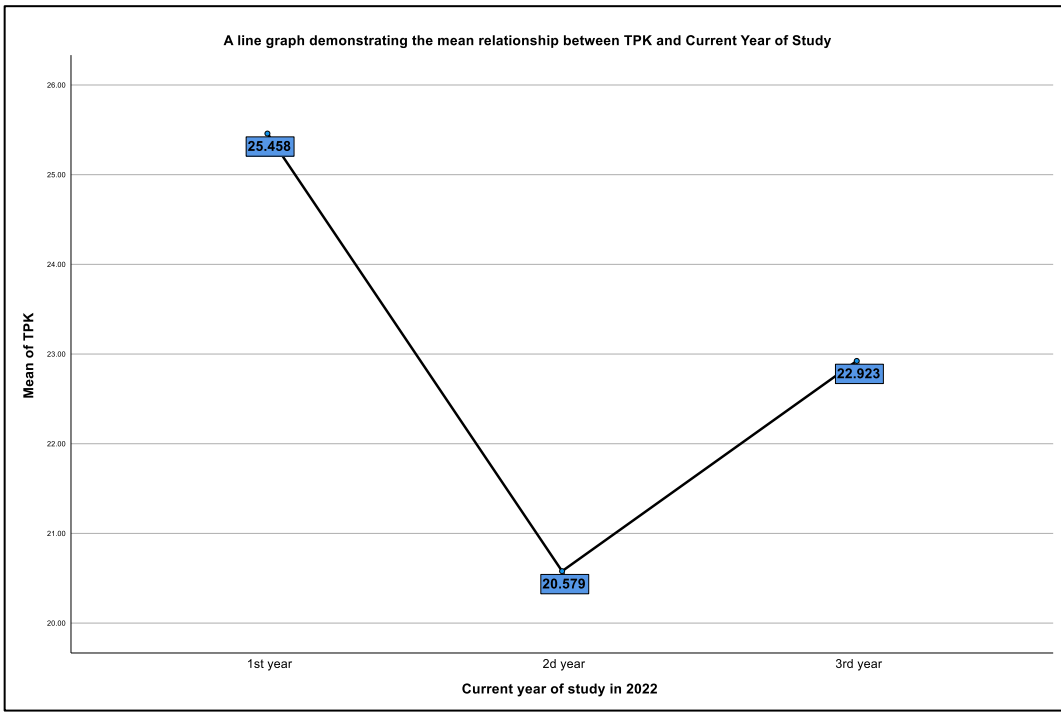
(b)

Note. PCK = Subscale of the TPACK instrument.



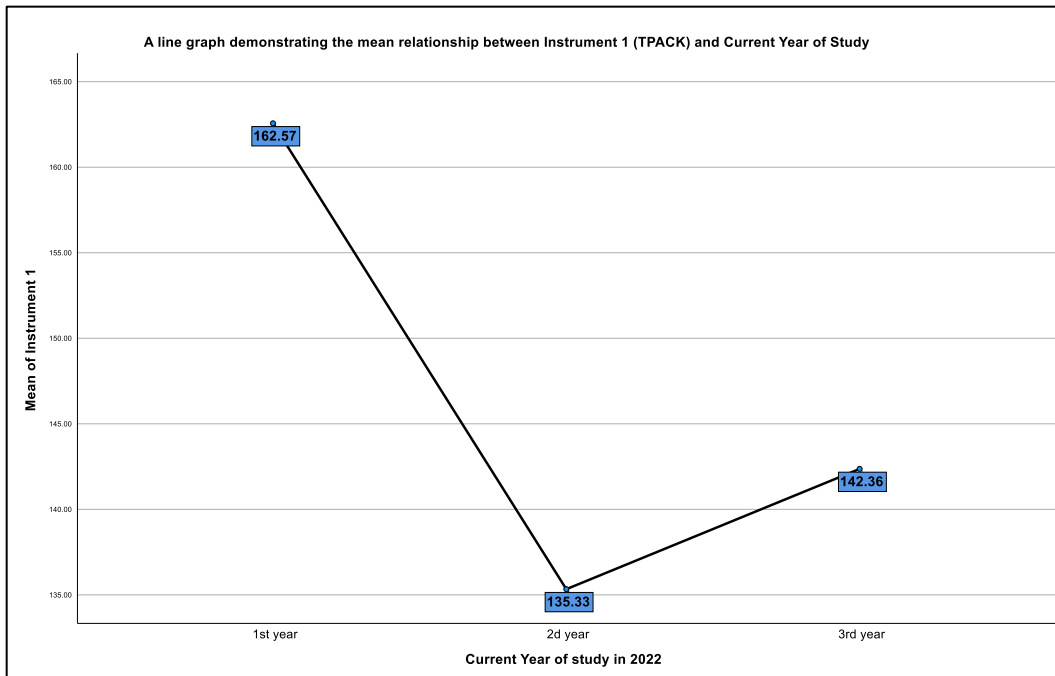
(c)

Note. TCK = Subscale of the TPACK instrument.



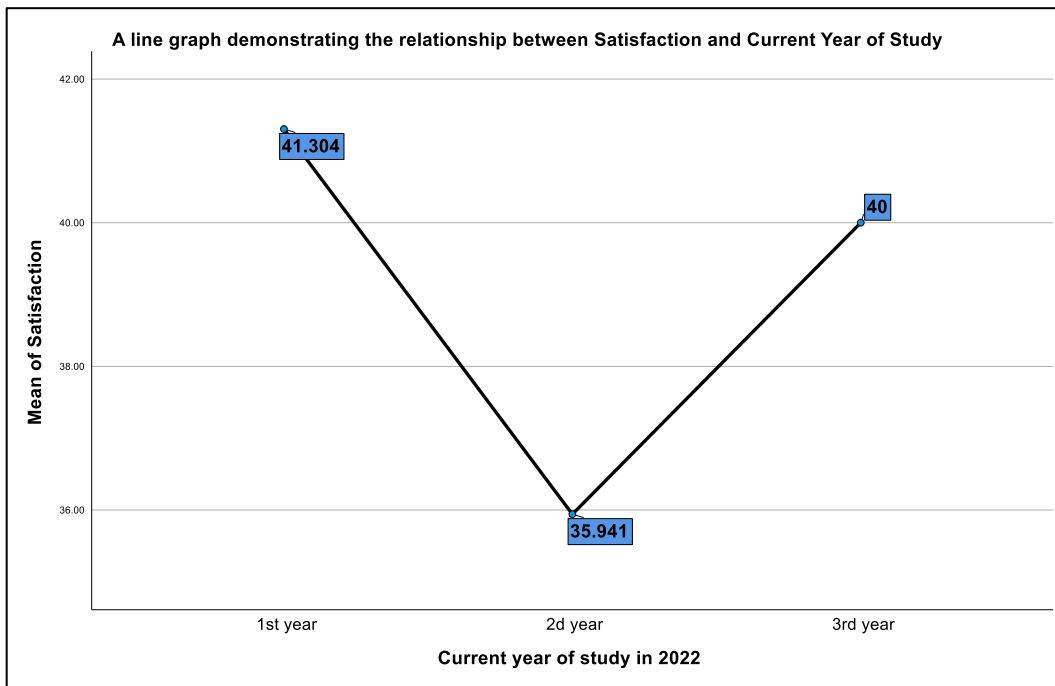
(d)

Note. TPK = Subscale of the TPACK instrument.



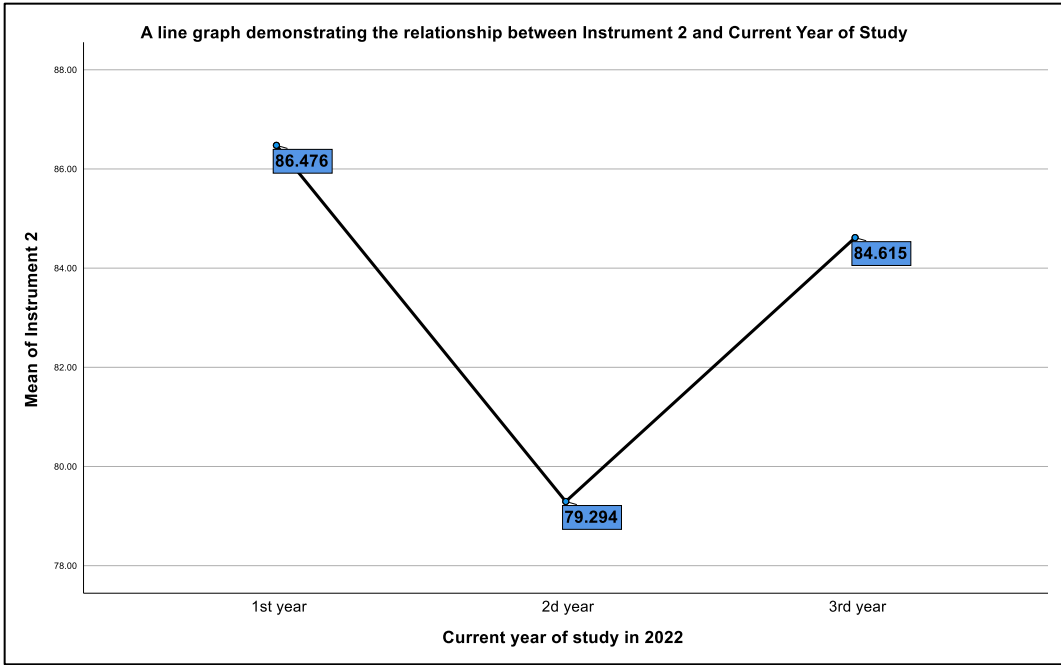
(e)

Note. Instrument 1= The TPACK Instrument.



(f)

Note. Mean of Satisfaction = The mean of the second subscale of the the Importance-Performance Instrument.



(g)

Note. Instrument 2 = The Importance-Performance Instrument.

4.3 Qualitative Insights

A total of 49 students answered the first question in the qualitative section, “In the first semester of 2022, what did you like about the primary method of teaching?” and 48 respondents filled in the second question, “In the first semester of 2022, what did you not like about the primary method of teaching?” Using Braun and Clark’s six-staged TA approach (Braun & Clarke, 2006; Braun et al., 2019) student responses were grouped and summarised (themes, codes, percentage (%) and examples) into two tables as presented in Appendix J, K, L, M. The simplified versions of both tables are presented below in Figures 12 and 13.

4.3.1 Liked

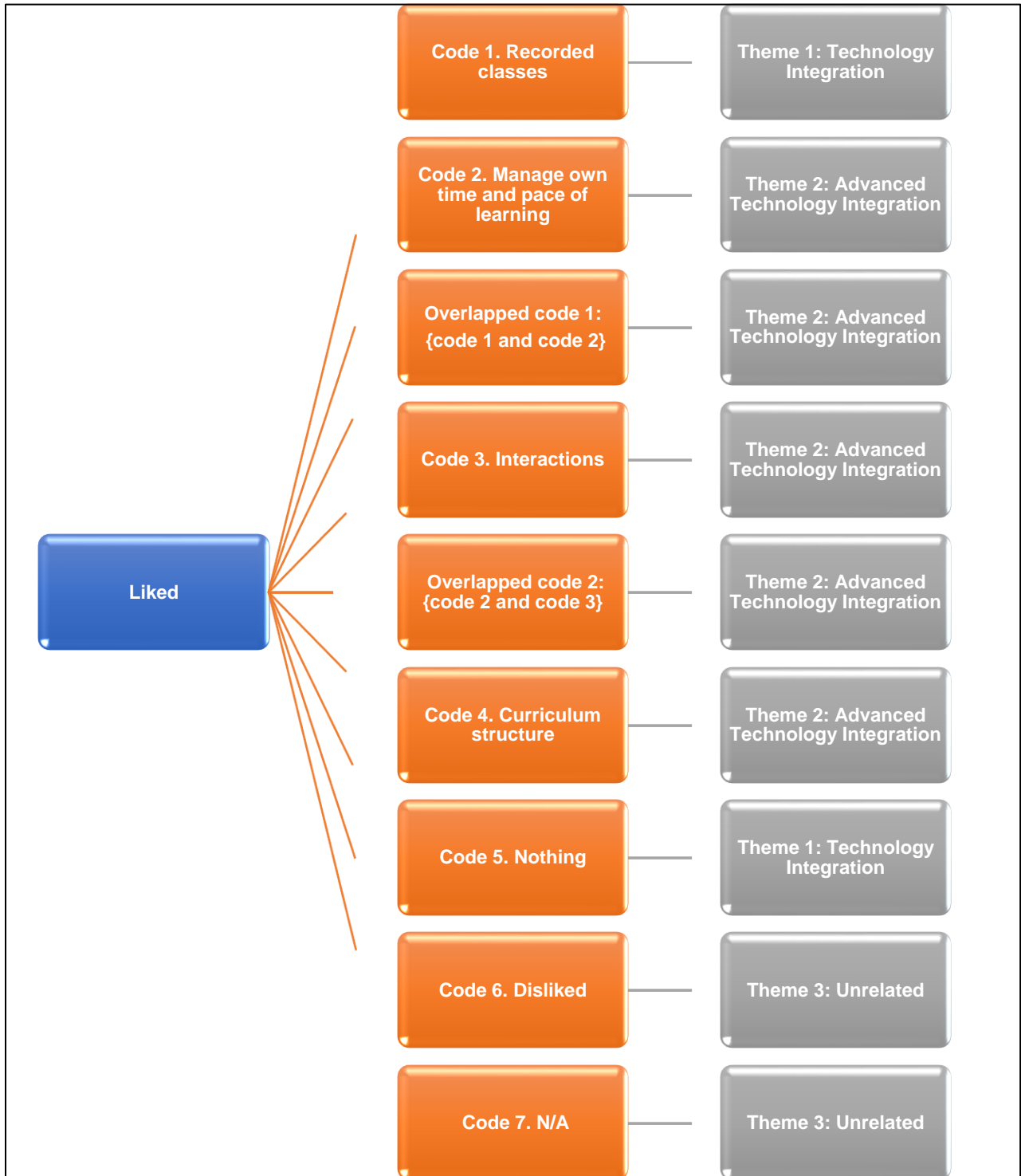
Figure 11 has outlined under Column 2, which features students liked about the ERT/L experience and through TA, the data produced seven stand-alone codes and two overlapped codes. The stand-alone codes included the following: Recorded lecturers (code 1), Manage own time and pace of learning (code 2), Interaction (code 3), Curriculum structure (code 4), Nothing (code 5, Disliked (code 6), Not applicable (code 7). The two overlapped codes demonstrated how the answers of respondents could embody more than one code at the same time, showing that overlapped code 1 consisted of codes 1 and 2 (Recorded lectures and manage own time and pace of learning) and that overlapped code 2 covered both codes 2 and 3 (Manage own time and pace of learning and social engagement).

After reviewing all nine codes, the researcher looked at how each code related to the qualitative question. Changing the focus from “what” to “how” and reviewing all the codes collectively, qualitative themes started to emerge. Looking at Figure 11, one will see that three themes summarise all nine codes as indicated in the third column. These themes include technology integration, defined as the basic online elements that are required to enable an OL environment and anything related to it, such as codes 1 (Recorded lecturers) and 5 (Nothing). The second theme was advanced technology integration: as the name implies, it moves one step beyond the previous theme and describes effective OL elements, like those illustrated by codes 2 (Manage own time and pace of learning), code 3 (Interaction), and code 4 (Curricular structure), and overlapped codes 1 (Recorded lectures and manage own time and pace of learning) and code 2 (Manage own time and pace of learning and social engagement). The third theme encompasses everything outside or not related to the research question, which specifically focused on what

students liked about the ERT/L experience. For that reason, the theme called, unrelated included code 6 (Disliked) and codes 7 (N/A), as they are unrelated to the research question.

Figure 12

What UP students liked about ERT/L



4.3.1.1 Codes 1 (Recorded lecturers), 2 (Manage own time and pace of learning) and Overlapped Code 1 (Code 1 and Code 2). What the reader will not see in Figure 11 but can see when referring to Appendix L: Coded Qualitative Data: Liked about ERT/L, is that the two most popular OL features were that students liked having access to online recorded classes (39%), “The fact that you could pause or rewind the lectures if you didn’t understand something, and rewatch the lectures again before a test to recap” (R49). As well as having the freedom to manage their own time and pace of learning (22.45%), “I could devise my own schedule, meaning I was not subjected to a lecture schedule” (R18). Stand-alone code 1 (Recorded lecturers) and code 2 (Manage own time and pace of learning) were then followed and confirmed by overlapped code 1 (Recorded lecturers + Manage own time and pace of learning), as eight students explained that they “liked” being able to watch recorded classes while studying and learning independently, “That I could work through some of the content in my own time and could study for a semester test I had in the evening during classes and still have the ability to rewatch and catch up on the work I missed” (R6).

4.3.1.2 Codes 3 (Interaction) and Overlapped Code 2 (Manage own time and pace of learning + Interaction). Three respondents also mentioned that ERT/L provided opportunities for interaction, “It was engaging, and all students were given equal opportunity to interact with the topics” (R16). Additionally, overlapped code 2 (Manage own time and pace of learning + Interaction), supported Code 3 (Interaction) when one student reported, “The content was taught in a very logical, easy to follow way. It was always very clear as to what was needed to know, and difficult concepts were highlighted” (R5). Modules like GTS251 in particular were very engaging and accommodating to all students. “We were provided with past papers, additional learning resources and enrichment content”. Furthermore, one respondent explained that online interaction reduced their social anxiety:

“We could access the content and recorded lectures according to our time and schedule. Answering and asking questions online rather than in person reduced social anxiety and made it easier to interact. It was also in the comfort of our own home” (R40).

4.3.1.3 Codes 4 (Curriculum structure) and 5 (Nothing). Additional ERT/L OL elements that were spoken about was that one respondent said that the online curriculum was better structured than the contact curriculum, “Class was organized and there was less excuses from the lecturers that they are either sick nor have a meeting to attend” (R42). While another respondent explained that there was nothing to like about the OL experience, “Nothing much” (R44).

4.3.1.4 Codes 6 (Disliked) and 7 (Not Applicable). Even though qualitative question 1 examined what UGs “Liked” about the ERT/L approach, three respondents (6.12%) said that they disliked the approach, “It was online teaching never like it, because I did not have a laptop, it was a big struggle for me” (R43). This respondent highlighted the daily lived reality of the digital divide, which is one of the greatest disadvantages of OL, especially in developing countries where students do not have access to hardware and software resources that are prerequisites to OL. Lastly, one respondent explained that the question was not applicable, “N/A” (R46).

4.3.2 Disliked

Figure 12 below illustrates what students “disliked” about ERT/L, generating 10 stand-alone codes, two overlapped codes and three qualitative themes. The stand-alone codes included the following: Impersonal/Disconnected/Reduced interactions (code 1), A lack of comprehension (code 2), A loss of concentration (code 3), Technical issues (code 4), Workload (code 5), Financial stressors (code 6), Pandemic related challenges (code 7), N/A (code 8), Nothing (code 9) and Liked (code 10). The two overlapped codes consisted of overlapped code 1 (codes 1, 2 and 3) and overlapped code 2 (codes 1, 2 and 4). Together, the stand alone and overlapped codes revealed three qualitative themes, identical to the previous themes that included technology integration, advanced technology integration and unrelated. Figure 12 only shows the simplified qualitative version; however, if the reader turns to Appendix M: Coded Qualitative Data: Disliked about ERT/L, there one will see all the codes and student answers.

4.3.2.1 Codes 1 (Impersonal/Disconnected/Reduced interactions), 2 (A lack of comprehension) and 3 (A loss of concentration) and Overlapped Code 1 (codes 1, 2 and 3). Many of the students (39.58%) disliked the OL model (ERT/L) because it was impersonal/disconnected and reduced interactions (code 1): “For me personally, online teaching

and learning is extremely impersonal” (R1), “You feel quite disconnected from your studies” (R17) and “Little to no engagement with fellow students and lecturers. In the department of psychology, we were only provided with narrated power points, and no live BBC sessions” (R48).

Unfortunately, because of the abrupt move to ERT/L, five students had problems with absorbing the online content (code 2: Comprehension), “We weren’t given enough opportunities to test our knowledge and understand of the module as a whole. We only had class tests (which counted towards our semester mark)” (R45). Another three said they encountered concentration problems (code 3: Concentration), “I couldn’t concentrate properly online” (R29). To summarise the above, one respondent reported that they experienced all three of the above (overlapped code 1),

“The fact that we couldn’t make friends easily as how we could have, live. A group of friends one could work with, with regard to helping each other understand the work or the assessments. I also didn’t like the idea of how it made some of us lazy to wake up and attend online classes or even study as how we would normally study when we attended contact classes” (R24).

4.3.2.2 Code 4 (Technical Issues) and Overlapped Code 2 (Codes 1, 3, 4). In addition to the previous isolating and cognitive concerns, the data showed that five students also had to overcome technical issues (code 4), “Getting disconnected from the online class because of loadshedding or network problems” (R25).

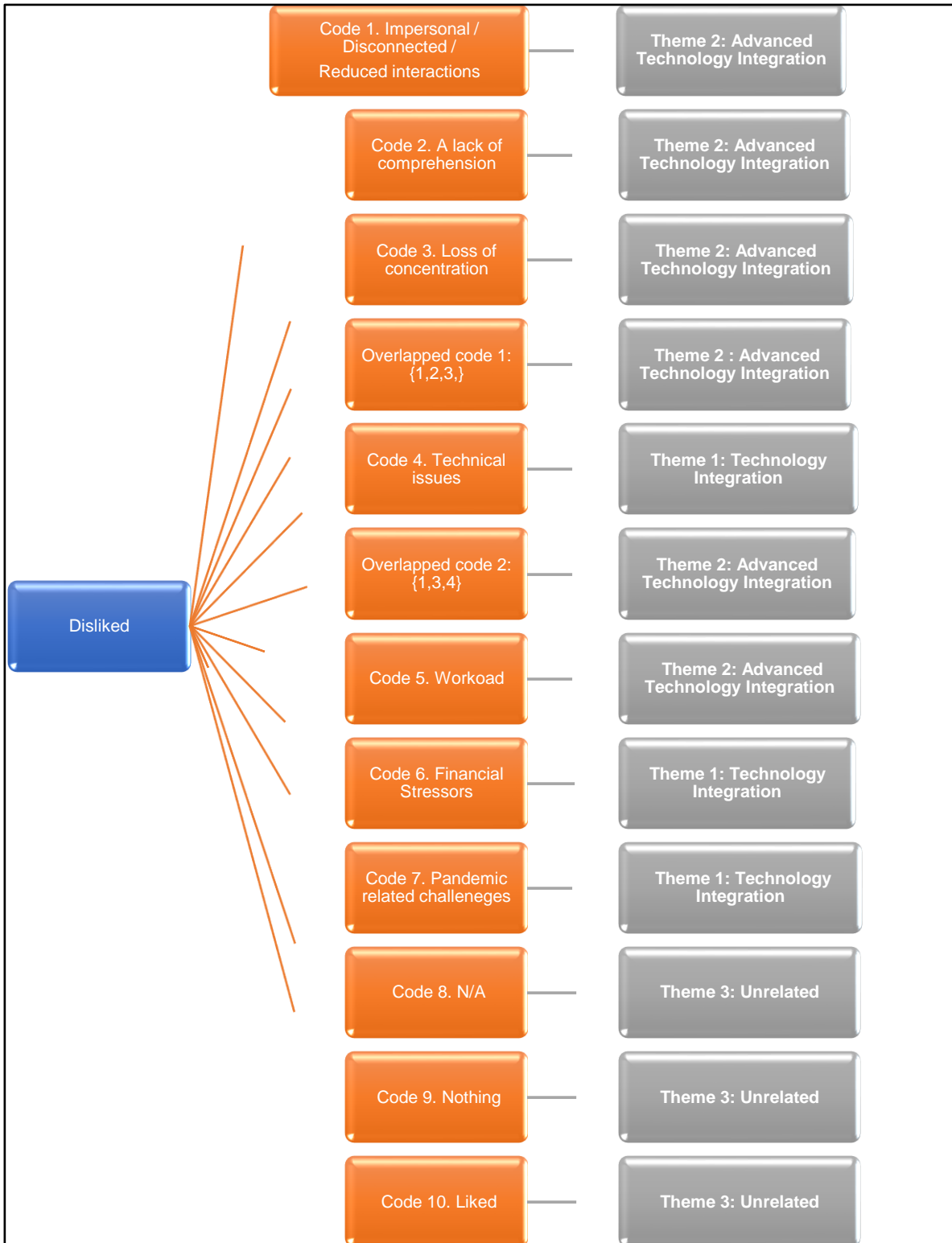
“After having to learn in front of a screen majority of the semester, I developed chronic headaches and bad eyesight. I needed to get classes because it strained my eyes, now I need to wear glasses for up close reading. Times when the Wi-Fi was down made it difficult to access the content. As nice as it was being at home, I started to develop depression from being inside 4 walls most of the time. It was miserable not being able to interact with people and being able to go outside. Learning online also made it difficult to focus and time-manage because it was easily available, I would procrastinate most of the time because I had time. Same applies to having the lectures recorded and posted afterwards, I didn’t really concentrate in classes ‘cause I could always go back” (R39).

4.3.2.3 Codes 5 (Workload), 6 (Financial stressors) and 7 (Pandemic related challenges). It was further noted that OL burdened students with an increased workload, (code 5: 6.25%) “There was more academic pressure in terms of workload” (P28). Contributing to financial stressors (code 6, as one student explained, “That I had to buy my own data to attend classes” (R36). While two students revealed that they had to deal with other pandemic related challenges (code 7) “It posed certain challenges due to the lockdown” (R46).

4.3.2.4 Codes 8 (N/A), 9 (Nothing) and 10 (Liked). Lastly, three students said that the research question was not applicable, “N/A” (R11), which is different from another three students who mentioned that there was nothing they did not like about the experience, “Nothing” (R47) and two UGs that liked everything about the OL model, “I liked absolutely everything” (R34).

Figure 13

What UP students disliked about ERT/L



Chapter 5:

Discussion, Limitations, Recommendations for Future Research and Conclusion

5.1 Introduction

Before the pandemic, if someone described a future scenario controlled by a highly contagious and deadly virus that dominated every aspect of human activity across the globe, it would have been unimaginable. Shutting down economic, educational, and social sectors of life such as banning public transport, social gatherings, restricting the movement of people and goods and confining families to their homes, would have made this even more inconceivable. The above description sounds like someone read a post-apocalyptic movie review. Within a couple of months, starting with the first COVID-19-detected patient in China, that movie became a lived reality worldwide, which even caught international experts off guard (Marmolejo & Groccia, 2022).

COVID-19 impacted and changed all spheres of life, however, this research report concentrated on one dimension, namely the HE sector. The main reason for this, among others, was that Pouris and Inglesi-Lotz (2014) highlighted that HE in SA is one of the most invaluable domains since it contributes to the growth of other sectors and like Marmolejo and Groccia (2022) explained, it correlates positively to better life chances. Secondly, overnight, the pandemic completely transformed HE teaching and learning pedagogies, administering ERT/L, alternatively known as the pandemic pedagogy. During that time, Black (2021, September 5) reported that studying online from home is the biggest educational experiment and the research upside is that COVID-19 is creating numerous research opportunities that were previously impossible to conduct (Mhlanga et al., 2022).

The past three COVID years (2019 - 2021) contain valuable information and therefore researchers need to document and record as much as possible about the ERT/L experience so that university curriculum designers have a holistic perspective of what worked, what did not and where to go from here. Lautenbach and Randell (2020) said, "We are, in fact, writing the history books of the future and for this reason, there is a need to document our progress" (p. 66). The research goal

is to contribute to the academic gap, as mentioned in the introduction, providing the academic community with empirical data to improve the HE sector in the future (Marmolejo & Groccia, 2022).

To understand how COVID-19 was affecting HEIs, the researcher examined the current literature available, which at the time was limited and found an unanswered research question that could complement SAHE. Specifically, this research study examined student perceptions of their ERT/L experience by asking the following research question, “What are university students’ perceptions of ERT/L at a South African university?”.

During the Literature Review (Chapter 2), the researcher found a valid (measures what it is supposed to) and reliable (consistent) measuring instrument, Tseng’s Student-Perceived TPACK Scale (Gravetter & Forzano, 2018; Tseng, 2016). The scale consists; of and measured, student perception according to seven dimensions, namely CK, PK, TK, PCK, TCK, TPK and TPACK which was adjusted as previously outlined in Chapter 3. Together with the research question and measuring instrument (TPACK Instrument), the researcher formulated seven research objectives that clarified how the researcher was going to achieve the research aim (answering the research question) (Dudovskiy, 2022).

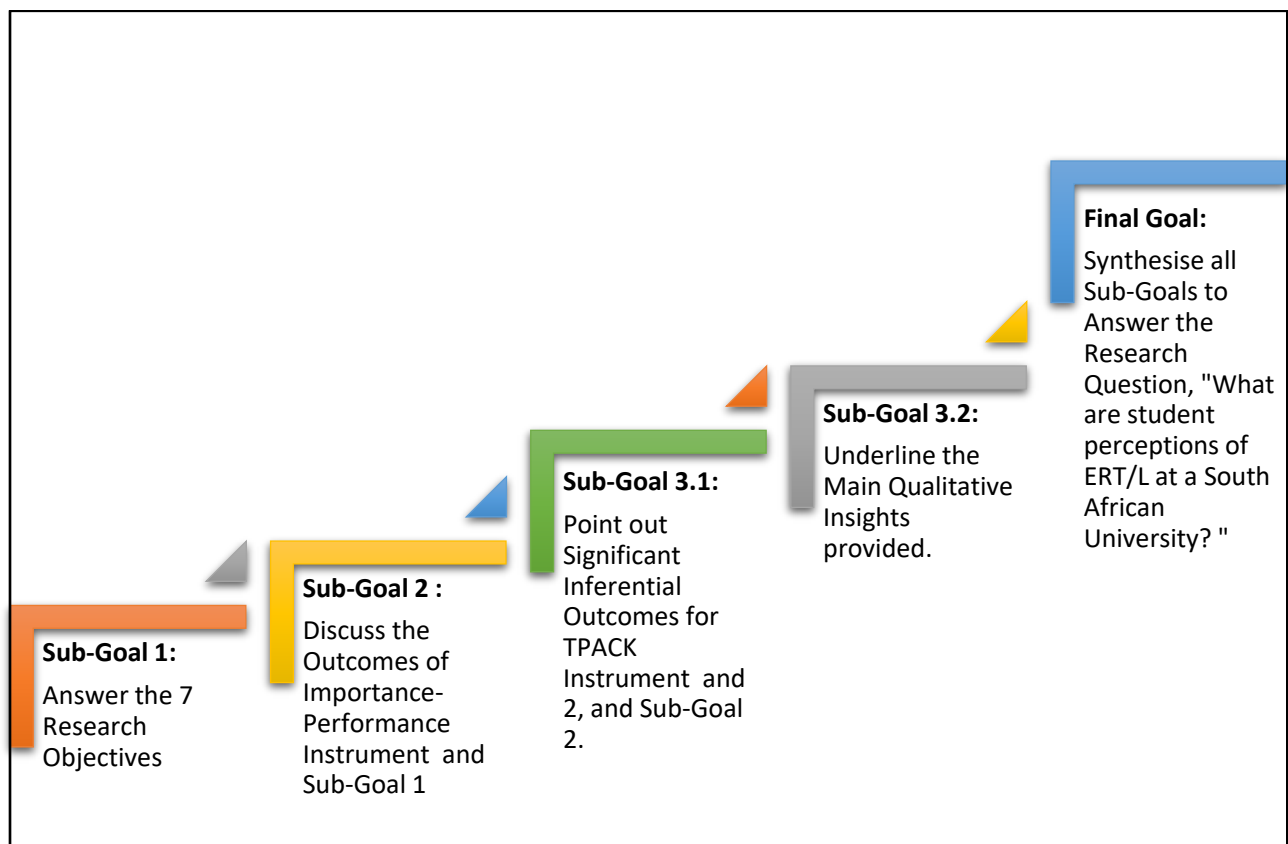
For additional insight on the psychological construct (student perception), the researcher also used Fuchs’s and Karrila’s Importance-Performance Instrument (Importance-Performance Instrument) and asked two qualitative questions (Fuchs & Karrila, 2021). Guided by the research question and TPACK Theory, Chapter 2 contextualised SAHE prior to the pandemic and during the pandemic. Chapter 3 explained to the reader how the research question determined the descriptive research strategy with a survey research design. Using UP’s Ethical Procedures, the researcher was assisted by the UP gatekeepers to help sample university UG participants using a non-random sampling method (convenience sampling) to conduct the research study.

In Chapter 4, the researcher described, summarised, and presented all the quantitative and qualitative data using the following four techniques: Descriptive Statistics, Inferential Statistics (a paired sample t-Test, several independent t-Tests and 2 ANOVA tests) and TA.

For this final chapter (Chapter 5), the researcher combined the information contained in the Literature Review (Chapter 2) and Results (Chapter 4) to achieve three sub-goals which all contributed to the main goal of answering the research question as seen below in Figure 14. Sub-goal 1, answered the seven research objectives based on the TPACK Instrument and sub-goal 2 linked the seven research objectives to the research outcomes associated with the Student Perceived Importance-Performance Instrument . Followed by an inferential statistical overview of both Student Perceived Instruments 1 and 2, sub-goal 3 simultaneously evaluated sub-goals 1, 2 and 3. Together with the three sub-goals and the qualitative insight (Sub-goal 3.2), the researcher drew upon two Student Perception Instruments (TPACK and Importance-Performance) , different methods (Descriptive Statistics, Inferential Statistics, and TA), different data types (quantitative and qualitative), to empirically answer the researcher question to the best of their abilities.

Figure 14

Chapter 5 overview: Goals that answer the final research question



Note. RQ= Research Question.

5.2 Sub-Goal 1: Answer the Research Questions

Given the descriptive data presented in Chapter 4, the researcher can conclude that UP students positively perceived their lecturer's TPACK skills. Based on the data, students were satisfied with all seven of their lecturer's TPACK skills, including TK, PK, CK, TPK, TCK, PCK and TPACK. Compared to a similar study published by Fathi and Yousefifard (2019), their research showed that students were satisfied with only four of the seven TPACK dimensions, such as TK, PK, CK, and PCK. In contrast to this study, students in that study were not satisfied with their lecturer's TPK, TCK and TPACK abilities. One plausible explanation for the difference between UP and PSU UG students can be attributed to the HE community prior to COVID-19. As discussed in the Literature review (Chapter two), student protests led to resilient blended learning strategies, which provided the tertiary sector with additional online exposure.

5.3 Sub-Goal 2: Outcomes of Importance-Performance Instrument and Sub-Goal 1

There are two crucial facts that the researcher learned about the Importance-Performance Instrument. Firstly, like the outcomes presented by Fuchs and Karrila (2021), this study's average mean for the first subscale ($M = 4.46$) was also significantly higher than the second subscale mean ($M = 3.95$), as illustrated in Table 9 (Chapter 4). Thus, UP and Thai (PSU) students have a statistically higher expectation of their lecturers' 10 ERT/L attributes as compared to how their lecturers performed based on those OL attributes.

Secondly, with this information, the reader will see that even though students positively perceived their lecturers TPACK skills based on ERT/L (TPACK Instrument), Importance-Performance Instrument showed that students perceived certain OL attributes as more important compared to other attributes and that there is room for improvement regarding their UP-lecturer's performance. Importance-Performance Instrument pinpoints exactly which OL attributes need improvement (Attributes 2 to 9), and this is very useful because curriculum developers and teachers now have empirical data on which OL areas (Attributes) need additional focus.

The researcher will briefly discuss two ERT/L OL attributes, one that does not need improvement and one that does need improvement as seen in Chapter 4. Looking at these tables, one will see that, students perceived A4 (The teacher is knowledgeable about the content and material of the

course) as extremely important ($M = 4.79$) and that their lecturer's performance of that OL attribute met their expectations ($M = 4.37$).

Alternatively, the same cannot be said of A2 (The teacher presents the material in an interesting and engaging way), since students perceived A2 as extremely important ($M = 4.74$) however, their lecturer's corresponding performance ($M = 3.61$) was below the average performance mean ($M = 3.95$) for the second subscale. This tells the researcher that A2 is important but needs improvement and research attention should the aim be to improve OL attributes for future OL pedagogies. For example, lecturers can receive additional training on how to present interesting OL content and ways to improve OL interactions.

To add to what was already emphasised, Importance-Performance Instrument empirically demonstrated which OL ERT/L attributes are more important than others. Therefore, researchers can concentrate on extremely important OL ERT/L attributes, removing irrelevant attributes to improve OL efficiency. For instance, A1 (The teacher begins the class with a review of the previous class) is the least important and performing OL attribute, which was verified by two previous independent studies involving Taiwanese and Swedish students (Fuchs, 2021; Fuchs & Karrila, 2021). Should lecturers and curriculum developers design an OL platform, they are able to empirically verify which attributes are more important as compared to others; and focus on those that require attention/adjustments to improve student satisfaction for user friendly OL platforms.

These results converge with both developing and developed ERT/L learning outcomes on both Subscales 1 and 2 but of equal importance to take note of is that there are disparities as well (Fuchs, 2021; Fuchs & Karrila, 2021). Perhaps, as Songca et al. (2021b) mentioned, each OL platform should be tailored to individual student needs instead of applying a broad based standardised OL prototype.

5.4 Sub-Goal 3.1: Significant Inferential Outcomes

In Chapter 4, during the second half of the quantitative analysis, the researcher presented and tabulated the inferential statistics of the t-Test (paired and independent), and ANOVA tests (1 and

2). As discussed in Sub-goal 2, the paired sampled t-test found significant deviations. The second significant difference was that ANOVA Test 2 detected significant differences on both TPACK Instrument and Importance-Performance Instrument, specifically between 1st and 2nd year students. With reference to the seven-line graphs (Figure 11, as presented in Chapter 4) that illustrate that the two cohorts differ significantly from one another with regards to CK (graph a), PCK (graph b), TCK (graph c), TPK (graph d), TPACK Instrument (graph e), Satisfaction (graph f), and Importance-Performance Instrument (graph g).

Additionally, 1st and 3rd year UG also deviated significantly from one another, as related to PCK (graph b). Against the background of the inferential outcomes, TPACK Instrument (graph e) and Importance-Performance Instrument (graph g), cannot all be compared to existing published literature, because it is limited. In other words, the researcher does not have other articles to compare Tables 12 (Chapter 4) and 13 (Chapter 4) with. However, Table 14: Current Year of Study, TPACK and Importance-Performance Instruments: Inferential Statistics (Chapter 4), specifically Importance-Performance Instrument (graph g) can be compared to the results reported by Fuchs (2021). Fuchs (2021) explained that 1st year students were generally the least satisfied as compared to 2nd and 3rd year cohorts.

Overall, Figure 11, also concluded that there was a positive relationship/association between performance (Satisfaction) and Current Year of Study (in an ascending order). Contradicting the outcomes for this study, as 1st year students were very satisfied with their lecturers ERT/L attributes, followed by 3rd year and then 2nd year UG students, as demonstrated below in Figure 14.

When the researcher looked at the quantitative descriptive and inferential data for TPACK Instrument and the Importance-Performance Instrument, one can conclude the following. That there are multiple factors that shape student perception. In addition, student perception is also determined by how psychological constructs are defined and measured (Chapter 2) and as illustrated in Chapter 4, student perception is also subjected to the following factors (third variables): a lecturer's knowledge of an OL environment is crucial, which OL attributes are considered as important during ERT/L according to students, how their lecturers apply that

knowledge to ensure satisfied student outcomes and which cohort lecturers are targeting (1st, 2nd or 3rd year UGs).

5.5 Sub-Goal 3.2: Main Qualitative Insights

To gain an understanding of the quantitative output, the Qualtrics Survey captured what students liked (Meta-Theme 1) and disliked (Meta-Theme 2) about the ERT/L experience. On the one hand because university students had access to unlimited synchronous and asynchronous online recorded classes, almost 40% agreed that they enjoyed the freedom that came with the ability to manage their schedules and study at their own pace. In several related studies, other researchers published similar OL benefits, substantiating that UG students from across the world value recorded classes and independent study (Elhadary et al., 2020; Makumane, 2021; Matarirano et al., 2021; Ramachandran & Rodriguez, 2020; Supriya et al., 2021).

The flip side to this is that the same number of university students from the same cohort experienced feelings of disconnections, describing the OL experience of ERT/L as “Impersonal”, characterised by limited interactions between student to student and student to lecturer relationships (+- 40%). When reviewing all the other disliked codes (features), it became apparent that multiple OL challenges contributed to students’ negative experiences. This is understandable, as the rapid move to ERT/L left students without time to adjust to the new OL platform. Instead of dealing with one change at one point in time (pandemic related challenges), students were bombarded simultaneously with multiple complications from all directions. This included and is not limited to the following: problems with OL comprehension, concentration, technical issues, overwhelmed with the amount of workload and new financial burdens.

UG students from both developing and developed nations also identified similar OL disadvantages as supported by the academic literature review (Abou-Khalil et al., 2021; Bawa, 2020; Gillis & Krull, 2020; Gonzalez-Ramirez et al., 2021; Laher et al., 2021; Matarirano et al., 2021). The qualitative data in both Meta-Themes (Liked and Disliked) showed that students without proper software and hardware were victims of the digital divide, drawing attention to the biggest OL limitation, especially in developing countries such as SA (Makumane, 2021; Matarirano et al., 2021).

Even though a large majority of students had a negative experience based upon limited social interactions, some students perceived the situation differently and had a positive experience. The academic literature on OL interaction is also mixed, some students see it as a benefit (Supriya et al., 2021), whereas others experience it as a drawback (LaHer et al., 2021; Ramachandran & Rodriguez, 2020).

Lastly, UP students' experiences and perceptions aligned with other cohorts as supported by other academic journal articles. However, there are situations when the data diverges from other published work. For example, one student mentioned that they liked the curriculum structure, while another student said they disliked it, and reported in the disliked meta-theme. Related to the Literature Review (Chapter 2), the results published by Bawa (2020), supported the former student, as OL is less structured and not more structured, contradicting what one student liked about their OL experience, which was not supported by other research findings within the context of this Literature Review.

5.6 Final Goal: Answering Research Question

The researcher originally asked the following research question, “*What are university students’ perceptions of ERT/L at a South African University?*”. The short answer to that question is that there is no such thing as a one-size fits all OL pedagogy. In a similar way, perfect research does not exist outside a vacuum (outside reality).

The longer answer to the question is that the main instrument used to operationalise the psychological construct (student perception) determined that UP UGs positively perceived the ERT/L experience based on their lecturer’s TPACK capabilities. The additional analysis revealed that despite positive student perception, there is still room for improvement. When developing an OL platform for an emergency like ERT/L, it would be an advantage to understand which OL attributes are perceived as important to university students and what year the UGs are registered for (1st, 2nd, or 3rd). After all, the inferential analysis showed that 1st year student perceptions were generally extremely satisfied and statistically different to the perceptions of their 2nd year cohorts on both the main instrument (TPACK Instrument) and the additional instrument (Importance-Performance Instrument). One plausible explanation for this difference could be related to students’ and lecturers’ ERT/L experience and knowledge. The reason 1st year students perceived the situation differently is because they had prior OL experience and so did their UP lecturers who are also defined as the third OL generation. The qualitative data also confirmed that OL has many advantages and disadvantages. Online recordings and the freedom to manage learning schedules and study pace contributed positively to student perceptions of ERT/L. Nonetheless, students were faced with many daily challenges, such as like loneliness, financial, family stressors, comprehension, concentration difficulties and technical problems.

Overall, the research substantiated that there were several factors that influenced student perceptions during ERT/L. Before COVID-19, as discussed in the introduction (Chapter 1), Akker (2004) and Thijs and Van Den Akker (2009) emphasised the weaknesses involved when shifting online without a detailed and established OL framework. The greatest limitation was a compromised curriculum that would fail. Nonetheless, despite the educational trials in the last century, the Spanish Flu of 1918, the 2015-2017 student protesting Hashtag # movements and the 2019-2022 COVID-19 pandemic (ERT/L), the community of UP survived and adapted to the circumstances. At the end of the day, every situation, circumstance and experience is unique with

its own limitations and benefits (like a unique fingerprint) but what matters is the outcome of that experience. As evidence of UP's resilience during COVID-19, the researcher was able to conduct this research study, highlighting "one of the few silver linings of the pandemic in our context " (Songca et al., 2021, p. 56).

5.8 Limitations

As a social researcher there is one fundamental principle that stands apart from the rest and there is a good reason for it. Theoretically, in class, many social scientists are taught that "perfect research" (flawless, without limitations) is an idealised hypothetical construct that many researchers aim to achieve even though it only exists in a vacuum (an empty space without any third variables) (Christensen et al., 2015; Gravetter & Forzano, 2018). The catch 22 is that social research is conducted within reality (characterised by many third variables), outside a vacuum and therefore many social research projects will have limitations. On a practical level, many researchers like myself may realise this soon after submitting their research proposal, defined by Leedy et al. (2021) as a condensed version of a dissertation that outlines why the research is so important and how the researcher plans to carry out the proposed research study.

Correspondingly, as discussed in Chapter 3: The Methodology, this study had three main limitations, namely the Descriptive Research Strategy, the Survey Research Design, and a non-probability sampling method (convenience) (Gravetter & Forzano, 2018).

Firstly, the researcher could not describe the relationship between variables (correlational or non-experimental research strategy) or explain the relationship between variables (experimental or quasi-experimental research strategies). For that reason, the study only described individual variables such as student perceptions of ERT/L during the first semester of 2022. Secondly, even though the researcher took measures to overcome two survey-designed drawbacks, unfortunately the design was weakened by a low response rate (smaller sample size), incomplete survey responses and participant attrition. Thirdly, because a convenient non-random sampling method was used, the probability of selecting a biased sample increased. For instance, the survey was completed by more females ($n = 70$) than males ($n = 13$) and more respondents represented Psychology UG ($n = 44$) versus English ($n = 14$) or Social UG ($n = 12$).

5.9 Suggestions for Future Research

Hypothetically speaking, should the researcher replicate this research study or provide insight to other interested social researchers, the following suggestions for going forward are highly recommended. Without a doubt, one of the first things the researcher should change, would be to re-arrange the five sections that consisted of the Qualtrics TPACK Survey. The researcher should structure the sections in terms of importance, ranging from the most important to the least important, as seen below in Table 15. Instead of placing the Demographics Section in the beginning of the survey, the researcher should place it at the end of the survey as suggested by Christensen et al. (2015).

Table 15
Updated Online Survey.

Current Qualtrics TPACK Survey	New Qualtrics TPACK Survey
1. Section A: Informed Consent	1. Section A: Informed Consent
2. Section B: Demographics	2. Section B: Student perception instrument one (32 TPACK items)
3. Section C: Student perception instrument one (32 TPACK items)	3. Section C: Two qualitative questions
4. Section D: Two qualitative questions	4. Section E: Student perception instrument two (20 Importance-Performance items)
5. Section E: Student perception instrument two (20 Importance-Performance items)	5. Section B: Demographics

Regarding the Qualtrics Survey settings, the researcher should change three things. To reduce the number of blank surveys recorded, a participant will be allowed multiple attempts to record their answers, whereas the current survey expected a respondent to complete the survey in a single continuous session. The second setting that the researcher should change is that in order to avoid incomplete survey sections each participant will only be allowed to proceed to the next survey section/part if the system recorded a response for each question within that section. Meaning, should a respondent not give their consent in survey Section A, the system will prevent them from continuing to the next section (Section B), highlighting that they need to select an answer for each question to be able to proceed.

The final Qualtrics Survey setting that should be modified is that the alternative of using only closed-ended questions to capture the demographics information of UG respondents, the researcher recommends using a mixed questions format. The new version would include four closed ended questions and one open-ended question (Other: Please specify...). The reason for this is that at the start of Chapter 4 under Table 1: Demographics Information ($N = 87$) (p. 93), the researcher highlighted that some respondents did not fill in each question. However, with the one open-ended question, the updated version can sidestep that drawback.

The second last suggestion is to advertise the research advert and Qualtrics research link on more than one digital platform (UP click-UP). Social researchers should try to use popular alternative SMP such as class WhatsApp groups that are organised by class representatives.

Then, as a last suggestion, on how to enhance the qualitative part of the survey, ask students two qualitative questions followed by the permission to WhatsApp call them afterwards. This gives the researcher the opportunity to repeat the student's response and then, ask them, "How can ERT/L be improved?". Alternatively, because this research study confirmed that there is a association or relationship between student perception and what OL attributes students perceived as important. Instead of using an existing Student Perceived Instrument like the TPACK Instrument or Importance-Performance Instrument, conduct a research study that starts with a qualitative section and then a quantitative section. That way the researcher can ask students what ERT/L attributes are important to them when learning online, why they are important before quantitatively measuring those OL attributes.

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[news/2020/2020-03/all-contact-teaching-postponed-for-monday-staff-to-continue-with-work.html](https://www.worldbank.org/news/2020/2020-03/all-contact-teaching-postponed-for-monday-staff-to-continue-with-work.html)

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Appendix A: Approval - University of Pretoria Ethics Committee



Faculty of Humanities

Fakulteit Geesteswetenskappe
Lefapha la Bomotheo



28 July 2022

Dear Mrs N McCallum

Project Title: Student perceptions of emergency remote teaching and learning at a South African University
Researcher: Mrs N McCallum
Supervisor(s): Prof DJF Maree
Department: Psychology
Reference number: 29121532 (HUM008/1221)
Degree: Masters

I have pleasure in informing you that the above application was **approved** by the Research Ethics Committee on 28 July 2022. Please note that before research can commence all other approvals must have been received.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should the actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

We wish you success with the project.

Sincerely,

A handwritten signature in black ink, appearing to read 'Karen Harris'.

Prof Karen Harris
Chair: Research Ethics Committee
Faculty of Humanities
UNIVERSITY OF PRETORIA
e-mail: tracey.andrew@up.ac.za

Research Ethics Committee Members: Prof KL Harris (Chair); Mr A Sizos; Dr A-M de Beer; Dr A dos Santos; Dr P Gutura; Ms KT Govindar Andrew; Dr E Johnson; Dr D Krige; Prof D Maree; Mr A Mohamed; Dr I Noomé; Dr J Okeke; Dr C Puttergill; Prof D Reyburn; Prof M Soer; Prof E Taljard; Ms D Mokalapa

Room 7-27, Humanities Building, University of Pretoria, Private Bag X20, Hatfield 0028, South Africa
Tel +27 (0)12 420 4853 | Fax +27 (0)12 420 4501 | Email pghumanities@up.ac.za | www.up.ac.za/faculty-of-humanities

Appendix B: Approval – University of Pretoria Survey Committee



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Office of the Registrar

2022-06-28

Ms N McCallum
Department of Psychology
Faculty of Humanities
University of Pretoria

Email: u29121532@tuks.co.za

Dear Ms McCallum

APPROVAL OF RESEARCH STUDY

The UP Survey Coordinating Committee has granted approval for the research study titled "Student perceptions of emergency remote teaching and learning at a South African University".

The proposed research study has to strictly adhere to the associated study protocol, as well as the UP Survey Policy and the Ethics Committee of the Faculty of Humanities instructions.

Please liaise with the Market Research Office in the Department of Institutional Planning (carlien.nell@up.ac.za) to officially register the study and to finalise the survey regulations, procedures and the fieldwork dates. In order to register the study, the Market Research Office has to receive the formal ethical approval letter from the Faculty of Humanities.

A final electronic copy of the research outcomes must be submitted to the Survey Coordinating Committee as soon as possible after the completion of the study.

Kind regards

A handwritten signature in black ink, appearing to read 'CMA Nicholson'.

Prof CMA Nicholson
REGISTRAR
CHAIRPERSON: SURVEY COORDINATING COMMITTEE

Rectorate, Room 4-23, 4th floor, Administration Building, Hatfield Campus
University of Pretoria, Private Bag X20
Hatfield 0028, South Africa
Tel: +27 (0)12 420 4236
Fax: +27 (0)12 420 5849
Email: regis@up.ac.za
www.up.ac.za

Kantoor van die Registrateur
Ofisi ya Mmušakarolo

Appendix C: Research Advert

Inviting all Psychology, Sociology, and English undergraduates.



About

The research study is investigating student perceptions of online learning during the pandemic.

Benefits

Providing information for UP curricula according to 21st-century teaching and learning.

15MIN ONLINE SURVEY

AVAILABLE TILL THE END OF OCTOBER 2022

For further info contact:
Nicole McCallum
076 061 1289 (Available on Whatsapp & Telegram)
U29121532@tuks.co.za



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Appendix D: Participant Information Sheet



PARTICIPANT INFORMATION SHEET

▪ TITLE OF THE STUDY

Student perceptions of emergency remote teaching and learning at a South African University

Hello, possible research participant. Thank you for taking the time to read this.

My name is Nicole McCallum. Currently, I am registered as a master's student at the Faculty of Humanities from the University of Pretoria (UP). As a master's student, I am required to complete a research project, and that is why I am inviting you to take part in my research project as a possible research participant.

Before you (potential participants) decide to participate in this study, it is important that research participants understand why the research is being done and what it will involve. That is why the researcher urges all possible volunteered participants to read the following information carefully, which will explain the details of this research project. Should the possible research participants have any questions, please feel free to ask the researcher (this is me in this case) anything related to the research study.

▪ WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this research study is to understand how students perceive (experience) online teaching and learning at a South African University. Before the pandemic, university teaching and learning took place on campus, face to face. However, since then, teaching and learning changed to online teaching and learning. This transformation is now referred to as Emergency Remote Teaching and Learning (ERT/L).

As a result of the pandemic, the researcher wanted to ask the following question, "What are university students' perceptions of ERT/L at a South African University?". The reason the researcher could ask that question is that this specific type of online learning has never happened before in South Africa, particularly because of COVID-19. Additionally, the current research on ERT/L in a South African context is limited. Therefore, the researcher decided to ask the following research question to contribute to South African academic literature, focusing on volunteered research participants perceptions of their experience.

▪ WHY HAVE YOU BEEN INVITED TO PARTICIPATE?

The potential participants have been invited to possibly participate because the participants' perception (experience) of online teaching and learning is important and valuable to South African academic literature. More specifically, the potential participants are registered as undergraduates at the Humanities Faculty from the University of Pretoria (UP).

Departmental Research Committee (ResCom)
University of Pretoria, Faculty of Humanities, Department of Psychology
Humanities Building, Lynnwood Road, Hatfield, 0083, South Africa
Private Bag X20, Hatfield 0028, South Africa
Email: psychology.rescom@up.ac.za
Website: www.up.ac.za/psychology

Fakulteit Geesteswetenskappe
Departement Sielkunde
Lefapha la Bomotheo
Kgoro ya Saekolotši

Accordingly, UP undergraduates are being taught online and therefore learning online. This gives the researcher access to available and possible research participants who can answer the research question.

▪ **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

Firstly, potential participants will be expected to sign an informed consent form. This form makes sure that the volunteered participants understand and feel comfortable with everything there is to know about the research project. Secondly, potential participants will be required to complete an online survey that will not take longer than 15 minutes.

▪ **CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Absolutely! Participating in this research study is completely voluntary. What this means is that potential participants are under no obligation to consent to participation even if they did agree previously. In other words, volunteered participants are free to withdraw at any time. Should the potential participants decide to withdraw, they do not have to give any reason for deciding to do so. Under no circumstances will the volunteered participants be penalised for withdrawing from the study because this study is voluntary.

▪ **WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER BE KEPT CONFIDENTIAL?**

Definitely. To ensure that the researcher maintains the research participants' confidentiality, the following procedures will be followed. Before the data is analysed, the researcher will separate all identified and unidentified information into two separate sheets as collected by the survey. The first identified dataset will be [uploaded](#) and password protected on the UP-Data Management platform, which will only be accessed by the researcher and Supervisor. The second unidentified dataset will then remove all identifying information and be replaced with record numbers. This second dataset will then be used for analyses, anonymising all participant-identifying information. Both datasets will be stored and protected on the UP-Data management platform for 15 years.

- ❖ Please note that participant information will be kept confidential, except in cases where the researcher is legally obliged to report incidents such as abuse and suicide risk.

▪ **WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

There will be no direct benefit to potential participants for participating in this study. However, indirectly the researcher's hope is that potential participants will get some academic benefit in the future. For example, once the dissertation is published, curriculum developers could use the knowledge to shape and improve online teaching and learning according to South African university needs.

▪ **WHAT ARE THE ANTICIPATED RISKS FROM TAKING PART IN THIS STUDY?**

None.

▪ **HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

All information will be stored, and password protected on the UP-Data management platform for 15 years. Should researchers use the data for future purposes, the stored data will be subject to further Research Ethics Review and approval if applicable.

▪ **WHAT WILL THE RESEARCH DATA BE USED FOR?**

Data gathered from the volunteered participants would be used for the following research purposes, MA [Dissertation](#) and an article publication.

- **HAS THE STUDY RECEIVED ETHICS APPROVAL?**

This study received written approval on the 28th of July 2022 from the Research Ethics Committee of the Faculty of Humanities, University of Pretoria. The ethical approval reference number is [29121532\(HUM008/1221\)](#). A copy of the approval letter can be provided to you upon request.

- **HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

Should the volunteered participants want access, they can access it in the UP depository once it is published. Please take note that publication may take another year or two.

WHO SHOULD I CONTACT IF I HAVE CONCERN, COMPLAINT OR ANYTHING I SHOULD KNOW ABOUT THE STUDY?

If any potential participants have questions about this study or because of participating experienced adverse effects, please contact the researcher whose contact information is provided below.

Should volunteered participants have questions regarding the rights as a research participant, or if problems arise which you do not feel you can discuss with the researcher, please contact the supervisor, who's contact details are below

Thank you for taking time to read this information sheet. If the potential participants do decide to volunteer, know that your participant is appreciated and valued.

Researcher

Nicole McCallum

076 061 1289

U29121532@tuks.co.za

Supervisor

Prof. David Maree

+27 (0) 12 420 2916

David.maree@up.ac.za

Activate Windows
Go to Settings to activate Windows.

Appendix E: Qualtrics^{XM} TPACK-21 Survey

The actual survey on Qualtrics^{XM} is no longer available, therefore the paper-based survey below.

Start of Block: Section A

CONSENT INFORMATION

Hello, possible research participant. Thank you for taking the time to read this. The photo on the left is a picture of me and my name is Nicole McCallum. Currently, I am registered as a master's student at the Faculty of Humanities at the University of Pretoria (UP).

As a master's student, I am required to complete a research project and that is why I am inviting you to take part in my research project as a possible research participant. Before you (potential participants) decide to participate in this study, it is important that research participants (you) understand why the research is being done and what it will involve. That is why the researcher (me) urges all possible volunteered participants (you) to read the following information carefully, which will explain the details of this research project.

Should the possible research participants (you) have any questions, please feel free to ask the researcher (me) anything related to the research study.

TITLE OF THE STUDY

Student perceptions of emergency remote teaching and learning at a South African University

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of this research study is to understand how students perceive (experience) online teaching and learning at a South African University. Before the pandemic, university teaching and learning took place on campus, face to face. However, since then, teaching and learning changed to online teaching and learning. This transformation is now referred to as Emergency Remote Teaching and Learning (ERT/L). As a result of the pandemic, the researcher wanted to ask the following research question:

“What are university students’ perceptions of ERT/L at a South African University?”.

The reason the researcher could ask this question is that this type of online learning has never happened before in South Africa, especially because of COVID-19. Additionally, the current research on ERT/L in a South African context is limited. Therefore, the researcher decided to ask the following research question to contribute to South African academic literature, focusing on volunteered research participants' perceptions of their experience.

WHY HAVE YOU BEEN INVITED TO PARTICIPATE?

The potential participants have been invited to possibly participate because the participants' perception (experience) of online teaching and learning is important and valuable to South African academic literature. More specifically, the potential participants are registered as undergraduates at the Humanities Faculty from the University of Pretoria (UP). Accordingly, UP undergraduates were taught online and therefore learning online during COVID-19. This can give the researcher access to available and possible research participants who can answer the research question.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

Firstly, potential participants will be expected to sign an informed consent form. This form makes sure that the volunteered participants understand and feel comfortable with everything there is to know about the research project. Secondly, potential participants will be required to complete a 15-minute online survey.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Absolutely! Participating in this research study is completely voluntary! What this means is that potential participants are under no obligation to consent to participation even if they did agree previously. In other words, volunteered participants are free to withdraw at any time. Should the potential participants decide to withdraw, they do not have to give any reason for deciding to do so. Under no circumstances will the volunteered participants be penalized for withdrawing from the study because this study is voluntary.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER BE KEPT CONFIDENTIAL?

Definitely! To ensure that the researcher maintains the research participants' confidentiality, the following procedures will be followed. Before the data is analyzed, the researcher will separate all identified and unidentified information into two separate sheets as collected by the survey. The first identified data set will be uploaded, and password protected on the UP-Data Management platform, which will only be accessed by the researcher and Supervisor. The second unidentified data set will then remove all identifying information and be replaced with record numbers. This second data set will then be used for analyses where all participant-identifying information will be anonymized. Then both data sets will be stored and protected on the UP-Data management platform for 15 years. Please note participant information will be kept confidential, **EXCEPT** in cases where the researcher is legally obliged to report incidents such as abuse and suicide risk.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

There will be no direct benefit to potential participants for participating in this study. However, indirectly the researcher's hope is that potential participants will get some academic benefit in the future. For example, once the dissertation is published, curriculum developers could use the knowledge to shape and improve online teaching and learning according to South African university needs.

WHAT ARE THE ANTICIPATED RISKS OF TAKING PART IN THIS STUDY?

None

HOW WILL THE RESEARCHER PROTECT THE SECURITY OF THE DATA?

All information will be stored, and password protected on the UP-Data management platform for 15 years. Should researchers use the data for future purposes, the stored data will be subject to further Research Ethics Review and approval if applicable.

WHAT WILL THE RESEARCH DATA BE USED FOR?

Data gathered from the volunteered participants would be used for the following research purposes, contributing to the researcher's MA Dissertation, and an article publication.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study received written approval on the 28th of July 2022, from the UP's Faculty of Humanities, specifically the Research Ethics Committee. The ethical approval reference number is 29121532 (HUM008/1221). A copy of the approval letter can be provided to you upon request.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

During the first part (The biographical section) of the online survey, potential research participants will be asked if they would like access to the research findings. Should the volunteered participants want access, they will be asked to share their email addresses with the researcher.

Please be patient as the MA publication could take approximately one to two years, however, to confirm, the researcher will email the results to potential participants as requested.

WHO SHOULD I CONTACT IF I HAVE CONCERNS, COMPLAINTS, OR ANYTHING I WANT TO CONFIRM REGARDING THE STUDY?

If any potential participants have questions about this study or as a result of participating experienced adverse effects, please contact the researcher whose contact information is provided below. Should the volunteered participants have questions regarding their rights as research participants, or if problems arise that you do not feel you can discuss with the researcher, please contact the Supervisor, whose contact details are below.

Researcher:

Nicole McCallum
076 061 1289
u29121532@tuks.co.za

Supervisor:

Prof. David Maree
012 420 2916
david.maree@up.ac.za

Thank you for taking the time to read this information sheet. If the potential participants do decide to volunteer, know that your participation is appreciated and valued.

I hereby give consent that my answers may be used for research purposes. I understand that my information is confidential, and that no identifying information will be selected. My results will form part of aggregated reporting and be anonymous. I also understand that I may stop the survey at any time and may request that my data not be used.

▼ No (1) ... Yes (2)

End of Block: Section A

Start of Block: Section B: Demographics section

Q1 Age: _____

Q2 Student number: _____

Q3 Permission to access academic grades:

May I access your academic grades (1)

▼ Yes (1) ... No (2)

Q4 Major (Registered for degree)

▼ English Department (1) Psychology Department (2) Sociology Department (3)

Q5 Gender

You identify as (1)

▼ Male (1) ... Prefer not to say (4)

Q6 Current year of study in 2022

▼ 1st year (1)

2nd year (2)

3rd year (3)

Q7 University living residence.

▼ At Home (1) ... UP residence (4)

Q8 Financial circumstances

In 2022, who pays for your studies.... (1)

▼ Parent/Guardian (1) ... Part time job (4)

Q9 Home residence

In which province is your family from.... (1)	▼ Eastern Cape (1) ... Western Cape (9)
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Q10 Home language

What is your home language... (1)	▼ Sepedi (1) ... Other (12)
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End of Block: Section B: Demographics section

Start of Block: Section C: Student Perceptions

- (i) Survey guide to answering the questions.
- (ii) Please choose one option that reflects your opinion the best.
- (iii) Additionally, answer all the questions, as honestly as possible so that we can make an accurate assessment of your experiences.
- (iv) Lastly, please complete the survey in one setting.

Thank you for participating.

Questions start on the next page...

Q1 In the first semester of 2022, based on a technological perspective, would you say that...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
1.1 Your lecturer knew about basic computer hardware (e.g., When using laptops/speakers/webcams). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.2 Your lecturer knew about basic computer software (e.g., Using UP Office 365/ Blackboard Collaborate/ click-UP/ UP Connect). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.3 Your lecturer knew how to solve technical problems linked to hardware issues (e.g., Troubleshooting student access to webcams/ speakers that previously did not work). (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.4 Your lecturer knew how to deal with technical problems related to software issues (e.g., Providing you with steps on how to install Google Chrome Web Browser/ UP connect/ sharing files in the cloud). (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.5 Your lecturer stayed up to date with new emerging technologies (e.g., E-books/ Facebook/ UP library/ UP news). (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2 In the first semester of 2022, based on how you and other students learned, would you say that...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
2.1 Your lecturer used a variety of teaching strategies (e.g., Asking you questions in class/ using PowerPoint slides/ demonstrating/explaining content etc). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.2 Your lecturer used different evaluation methods and techniques (e.g., Online tests/ written reports/ group/ oral projects). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.3 Your lecturer understood student learning difficulties (e.g., Allowing you to submit work via alternative platforms/ extending submission dates because of load-shedding). (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.4 Your lecturer adjusted the way she/he taught by accommodating students according to their learning needs. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.5 Your lecturer knew how to manage his/her class (e.g., Established clear class rules/ created a friendly learning environment/ developed a good relationship with all their students). (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3 In the first semester of 2022, regarding your lecturer's knowledge on the module, would you say that...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
3.1 Your lecturer is an expert on the module. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.2 Your lecturer is good at teaching the module. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.3 Your lecturer has a natural teaching ability. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.4 Your lecturer created teaching materials (e.g., Using relevant textbooks/ videos/ recordings) that did enhanced your learning. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.5 Your lecturer answered questions related to the module to the best of their ability. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4 In the first semester of 2022, would you say that your lecturer used technology to improve the way you learned...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
4.1 Your lecturer used technology to motivate you to learn (e.g., Asking students to review PowerPoint slides before/after class independently). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.2 Your lecturer used technology to explain difficult concepts clearly (e.g., Using educational videos). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.3 Your lecturer used interactive technology to interact more with you and other students (e.g., Presenting live online classes). (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.4 Your lecturer used technology to improve their teaching activities (e.g., The technology used in the class increased your concentration). (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.5 Your lecturer used technology that was appropriate for his/her teaching. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5 In the first semester of 2022, when your lecturer combined their technical and content skills, would you say that...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
5.1 Your lecturer used technology that helped you remember the module content better (e.g., Provided you with access to recorded classes/ extra learning resources). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.2 Your lecturer used technology to help you understand the module content better (e.g., Using more than one example/ case study to explain difficult concepts). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.3 Your lecturer used technology that expanded your insight regarding the module content (e.g., Providing you with additional e-resources). (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6 In the first semester of 2022... can you recall...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
6.1 That at the end of the lecture you understood what your lecturer presented. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.2 Your lecturer provided additional learning opportunities (e.g. extra learning activities/ additional reading resources/learning references). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.3 Your lecturer used group activities to help you learn the module content better. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.4 Your lecturer used class discussions to improve your understanding. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 In the first semester of 2022... regarding your overall online experience, would you say that...

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
7.1 Your lecturer presented content with appropriate strategies via different technology types (e.g., Live and recorded classes). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.2 Your lecturer provided you with the opportunity to practice what you learned with appropriate strategies via different technologies (e.g., Textbook exercises/ additional online resources). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.3 Your lecture provided you with the opportunity to demonstrate your skills with appropriate strategies via different technologies (e.g., Individual online tests and group assignments). (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.4 The way your lecturer presented the module using technology was engaging. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.5 The way your lecturer presented the module content using technology helped you with your learning. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Section C: Student Perceptions

Start of Block: Section D: Open-ended questions

Q1 In the first semester of 2022, what did you like about the primary method of teaching?

Q1 In the first semester of 2022, what did you not like about the primary method of teaching?

End of Block: Section D: Open-ended questions

Start of Block: Section E: Importance / Performance

Q1 How important are the following 10 online learning attributes to you?

	Not Important at all (1)	Not very important (2)	Somewhat Important (3)	Very Important (4)	Extremely important (5)
1. The lecturer begins the class with a review of the previous one. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The lecturer presents the material in an interesting and engaging way. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The lecturer presents the material in an organized and coherent way. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The lecturer is knowledgeable about the content and material of the course. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The lecturer is friendly and patient with the students. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The course material is well and professional prepared. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The course material is easy to access in the Learning Management System (Click UP). (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Students are engaged to actively participate in the discussion. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I am learning something which I consider valuable. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I am finding the course challenging and stimulating. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2 How satisfied are you regarding the 10 online learning attributes?

	Not at all satisfied (1)	Not very satisfied (2)	Somewhat satisfied (3)	Very satisfied (4)	Extremely satisfied (5)
1. The lecturer begins the class with a review of the previous one. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The lecturer presents the material in an interesting and engaging way. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The lecturer presents the material in an organized and coherent way. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The lecturer is knowledgeable about the content and material of the course. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The lecturer is friendly and patient with the students. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The course material is well and professional prepared. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The course material is easy to access in the Learning Management System (click-UP). (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Students are engaged to actively participate in the discussion. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I am learning something which I consider valuable. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I am finding the course challenging and stimulating. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Section E: Importance / Performance

Appendix F: Email sent to The English Head of Department

Good day Prof MA Brown

A very happy Spring day to you Prof



My name is Nicole McCallum, and currently, I am registered as a Psychology Research Master's student in the Faculty of the Humanities at the University of Pretoria (UP). As part of my degree, I need to do a mini dissertation that involves sampling possible research participants and fortunately I have Prof David Maree (David.maree@up.ac.za) who is my Supervisor. I have included Prof Maree in my email to you Prof Brown.

My research aims to understand university student perceptions and experiences of emergency remote teaching and learning (ERT/L) at a South African university.

Therefore, I am contacting Prof Brown for the following reasons.

1. I would like to request permission to ask your English students to participate in my research study.
2. If Prof Brown agrees, would you please provide me with the name and email address of your undergraduate coordinator, who may be able to assist me with contacting the current undergraduate English lecturers within your department?

I will ask them to announce the request on the current modules on ClickUp and the students will be provided with a Qualtrics link to complete a survey.

Herewith find attached the following for your perusal.

1. UP Research Ethics Committee -Approval letter
2. UP Survey Coordinating Committee - Approval letter
3. Link to the research study survey:
https://pretoria.eu.qualtrics.com/jfe/form/SV_daJHdjk6CN6I5HU
4. Research advert
5. Participant information and consent letter included in the survey.

Regards 🌸
N. McCallum
u29121532

Appendix G: Email sent to The Psychology Head of Department

Good day Prof Tharina Guse

A very happy Spring day to you Prof



My name is Nicole McCallum, and currently,

I am registered as a Psychology Research Master's student in the Faculty of the Humanities at the University of Pretoria (UP). As part of my degree, I need to do a mini dissertation that involves sampling possible research participants and fortunately I have Prof David Maree (David.maree@up.ac.za) who is my Supervisor. I have included Prof Maree in my email to you Prof Guse.

My research aims to understand university student perceptions and experiences of emergency remote teaching and learning (ERT/L) at a South African university.

Therefore, I am contacting Prof Guse for the following reasons.

1. I would like to request permission to ask your Psychology students to participate in my research study.
2. If Prof Guse agrees, would you please provide me with the name and email address of your undergraduate coordinator, who may be able to assist me with contacting the current undergraduate Psychology lecturers within your department?

I will ask them to announce the request on the current modules on ClickUp and the students will be provided with a Qualtrics link to complete a survey.

Herewith find attached the following for your perusal.


1. UP Research Ethics Committee -Approval letter
2. UP Survey Coordinating Committee - Approval letter
3. Link to the research study survey:
https://pretoria.eu.qualtrics.com/jfe/form/SV_daJHdjKGCN6I5HU
4. Research advert
5. Participant information and consent letter included in the survey.

Regards 🌻 😊

N. McCallum
u29121532


Appendix H: Email sent to The Sociology Head of Department

Requesting permission to sample UP students Outbox Inbox

 Nicole McCallum <u29121532@up.ac.za>
to Debbie, David

Thu, 3 Sept, 11:11

Good day Prof Debbie Bonnin
A very happy Spring day to you Prof



Hi Prof Bonnin

How are you? It has been such a long time.
Don't know if you remember me but I was one of your sociology students back in the day. Perhaps this could help, I took Sociology 120 and 220 at the same time, way before COVID, when Prof was lecturing and the recommended textbook was *The Global Shift* by Peter Dicken which was completely fascinating. I do hope Prof is still lecturing SOC 220. 🌸

Anyhow, I'm now busy with my final year of doing a Masters in Research Psychology. As part of my degree, I need to complete a mini-dissertation that involves sampling possible research participants.
Fortunately I'm not in the dark, I have Prof David Maree (David.maree@up.ac.za) who is my Supervisor.
I have included Prof Maree in my email to you Prof Bronnin.

My research aims to understand university student perceptions and experiences of emergency remote teaching and learning (ERT/L) at a South African university.

Therefore, I am contacting Prof Bonnin for the following reasons.

1. I would like to request permission to ask your Sociology students to participate in my research study.
2. If Prof Bonnin agrees, would you please provide me with the name and email address of your undergraduate coordinator, who may be able to assist me with contacting the current undergraduate Sociology lecturers within your department?
I will ask them to announce the request on the current modules on ClickUp and the students will be provided with a Qualtrics link to complete a survey.

Herewith find attached the following for your perusal.

1. UP Research Ethics Committee -Approval letter
2. UP Survey Coordinating Committee - Approval letter
3. Link to the research study survey:
https://pretoria.eu.qualtrics.com/jfe/form/SV_da7HqJK6CN6I5HU
4. Research advert
5. Participant information and consent letter included in the survey.

Warm Regards 🌸 😊
N. McCallum
u29121532

Appendix I: Quantitative Data

SPSS Raw Data	https://drive.google.com/file/d/143zCTC7C0d-025gBKUUyeCTIMq1VRqhP/view?usp=share_link
SPSS Cleaned Data	https://drive.google.com/file/d/1Vc3kSk8J51kGNYzjwUFjSgoqq-VSjadw/view?usp=share_link
The 7 Research Objectives	Research Question One https://drive.google.com/file/d/1yAhhLjeJJ0Izq8QpGuuDIM1CXCEihaGT/view?usp=share_link
	Research Question Two https://drive.google.com/file/d/1QbDCXoUrpEfgYo4upXbNNKmQh0msqU7/view?usp=share_link
	Research Question Three https://drive.google.com/file/d/1uUywBminNey-VgJ6oVJRVaEmdWzarLc4/view?usp=share_link
	Research Question Four https://drive.google.com/file/d/1O3_-prJXFkYf8QI3QCblcaXxKYtDUL3g/view?usp=share_link
	Research Question Five https://drive.google.com/file/d/1O3_-prJXFkYf8QI3QCblcaXxKYtDUL3g/view?usp=share_link
	Research Question Six https://drive.google.com/file/d/11Vcu-5TMdxDAfaN7sfu-0C4SPz_zW5HF/view?usp=share_link
	Research Question Seven https://drive.google.com/file/d/143zxXsuCfsajb04_VhpxbETQIS4HfJB/view?usp=share_link
All Quantitative Data	https://drive.google.com/drive/folders/1GKfrzJCGZ807QISkW2ZepRQZlxZbHO3-?usp=drive_link

Appendix J: Qualitative Data (not coded): Liked about ERT/L

Respondent	D_Q1_LIKED
1	It was quite convenient to be able to attend lectures and tutorials from any place with internet access should I have not been able to come to the university due unforeseen circumstances.
2	I enjoyed that the lectures were recorded, so I could pause the lecture, or watch it again. This allowed me to properly absorb the information without feeling time pressure.
3	The ability to manage one's timetable and time to fit their needs
4	The fact that the lectures were recorded so that I could go back to them whenever I needed them.
5	The content was taught in a very logical, easy to follow way. It was always very clear as to what was needed to know and difficult concepts were highlighted. Modules like GTS251 in particular was very engaging and accommodating to all students. We were provided with past papers, additional learning resources and enrichment content.
6	that i could work through some of the content in my on time and could study for a semester test i had in the evening during classes and still have the ability to rewatch and catch up the work I missed
7	It was convenient and easy. It didn't require me having to leave my home and thus I was able to devote more time to studying than I was to making sure I reached classes on time. I was able to rewatch lectures to further my understanding and clarify anything that I wasn't sure about.
8	It allowed me to engage with my peers which would give me different perspective's on certain topics.
9	Freedom of self-study enhanced my learning and also being able to rewatch lectures
10	The extensive class discussions, time was not limited with online classes
11	Online teaching was easy to access and made full usage of the lecturing time efficiently.
12	The easy access of recorded lessons in case I want to refer back for something I missed
13	It accommodated my learning style which is taking time to process information and making thought through and mostly accurate conclusions, unlike in a contact class where I had to answer a question on the spot.
14	I enjoyed that it was more self-study but if I struggled I could go back and look at slides/ listen to recorded lectures
15	I was able to review the work when I needed to.
16	It was engaging and all students were given equal opportunity to interact with the topics.

Respondent	D_Q1_LIKED
17	The easy accessibility to lectures in an online and recorded context and the ability to access the content at times that suited me to view them and make notes. The convenience of reviewing and rewinding lectures in order to digest and understand the content better. and lastly the ease of not having to travel a long distance to campus in order to attend a short lecture that consists of a lot of interruptions due to questions in class detracting from the lecturer to explain all the content planned for that specific lecture.
18	I could devise my own schedule, meaning I was not subjected to a lecture schedule.
19	Engaging with my fellow peers and lectures
20	We had recordings so I managed to rewatch them to understand the concept better.
21	Working at my own pace
22	Having recorded lectures allowed for flexible work hours. Also was a benefit for note-taking, ie. pausing when necessary
23	It was online and much more convenient. There was way less distractions and I was still able to attend doctors appointments etc. for health reasons which is more difficult back on campus.
24	The availability of videos made by the lectures explaining the content in more detail and the opportunity to have contact sessions if I had questions or wanted face-to-face interaction with the lecture.
25	Online learning was a privilege because one had an opportunity to engage with technology more, as a result of online learning. Technology engagement resulted to one being able to know how to navigate through online communication and learning. It also made learning a bit simpler in some instances. I also liked the fact that one did not have to wake up everyday in the morning to attend classes on campus and even if you missed a class, one could watch the recordings which were posted everyday for each module.
26	I liked the fact that my lectures were recorded so i could always look back on what i missed during the online class, which is very helpful since i get multiple chances to reflect on the lessons.
27	I could rewatch the lectures as often as I needed to.
28	I liked that everything was recorded and had access to visiting back and improve my understanding.
29	I got to be taught using a different platform(online) other than contact classes
30	I enjoyed staying at home and doing lectures in my own time.
31	recording of lectures
32	The fact that I could rewatch videos and slides if ai struggled to understand the work.
33	I did not really enjoy it at all. I felt that some of my lecturers were not always 'on top of it'.
34	It allowed for a more flexible method of teaching and learning that was more relaxed.
35	It made my learning much easier.

Respondent	D_Q1_LIKED
36	It was definitely more one on one and more interactive
37	That lectures were being recorded and I could access them whenever I want.
38	I was able to grasp more information and work in my own time at my own pace.
39	I liked the fact that I was able to watch pre-recorded videos in my own time and on my own schedule.
40	We could access the content and recorded lectures according to our time and schedule. Answering and asking questions online rather than in person reduced social anxiety and made it easier to interact. It was also in the comfort of our own home.
41	I liked the fact that lecturers were always willing to try to understand the technology even though it was difficult for some of them because they had not adapted at first.
42	class was organized and there was less excuses from the lectures that they are either sick nor have a meeting to attend.
43	It was online teaching never liked it, because I did not have a laptop it was a big struggle for me.
44	Nothing much
45	Being on campus allowed students to be interactive and allowed for more understanding.
46	N/A
47	It was flexible and innovative. It made learning easier on some concepts
48	It was always available, recorded if you couldn't attend the classes etc. Resources were posted so you could access at your own time
49	The fact that you could pause or rewind the lectures if you didn't understand something, and rewatch the lectures again before a test to recap.

Appendix K: Qualitative Data (not coded): Disliked about ERT/L

Respondent	D_Q1_DISLIKED
1	For me personally, online teaching and learning is extremely impersonal.
2	The quality of the lecture videos was not always great. Sometimes the slides were not as clear as they could be.
3	Sometimes lecturers didn't manage technical difficulties very well causing the class to fall behind
4	Even though it was as interactive as it could be, it did not feel very personal.
5	The hybridization of on campus and online activities. Either everything should be on campus, or everything should be online, not mixed (at least in my opinion).
6	I found some of the lectures boring to listen to and not very engaging as they would often drone on for an hour in a pre-recorded lecture and go through the exact same in the live lecture
7	It was difficult to stay focused. It was easy to get distracted and I was not able to engage with my peers as much as I would have liked
8	Sometimes my peers would not engage which meant I would have to take on more workload.
9	Only writing online tests for SLK310 did not feel engaging enough to cover the large volume of work - would have preferred additional assignment-based assessments to engage with the work more.
10	Constant interruptions with questions while the teacher was trying to explain something in depth. Another negative was some lecturers did not provide additional resources and weren't able to answer questions fully
11	N/A
12	The network issue that disrupts lessons and assessments, tests or quizzes
13	It limited time to engage with the lecturer. If I had a hard time understanding a concept, it would be close to impossible to ask the lecturer to explain again to me as I would have to take my time and dot down what I need help with, just to avoid taking extra time to try and find the right words to ask the question and go on about what I understand and what I am struggling to understand.
14	That they did not make use of MindTap again like in the first year. Mind tap has convenient features such as activities to do after each chapter
15	There was a lack of social interaction.
16	I generally preferred everything about the online lecture system, due to its convenience.
17	You feel quite disconnected from your studies
18	Nothing
19	Some online classes were not recorded so when I had missed it I could not get access of the recording
20	Impersonal

Respondent	D_Q1_DISLIKED
21	It was difficult to stay motivated to keep up to date with lectures. It was a very isolated and one-sided experience.
22	N/A
23	The fast transition from online to on campus test and no communication in what type of questions will be asked (application or theoretical)
24	The fact that we couldn't make friends easily as how we could have, live. A group of friends one could work with, with regards to helping each other understand the work or the assessments. I also didn't like the idea of how it made some of us lazy to wake up and attend online classes or even study as how we would normally study when we attended contact classes.
25	Getting disconnected from the online class because of loadshedding or network problems.
26	Sometimes, lecturers would read from the slides which made it feel pointless to listen to the lecture.
27	Nothing
28	there was more academic pressure in terms of workload.
29	I couldn't concentrate properly online.
30	the way some work were given to us without proper explanation
31	I felt like I couldn't completely focus in the live classes because I am easily distracted and focus easier in person.
32	I did not like pre-recorded lectures as I felt that I was essentially having to self-study.
33	It was hard not having the option to communicate face to face. The non-contact classes made adapting a bit difficult.
34	I liked absolutely everything.
35	N/A
36	That I had to buy my own data to attend classes.
37	The amount of time spent behind my electronic devices.
38	I did not like the fact that group discussion was largely missing from the lectures. Despite attempts at live discussion classes, many of these classes were under-attended and the online collaborate space was ultimately not conducive to discussion.
39	After having to learn in front of a screen majority of the semester, I developed chronic headaches and bad eyesight. I needed to get classes because it strained my eyes, now I need to wear glasses for up close reading. Times when the Wi-Fi was down made it difficult to access the content. As nice as it was being at home, I started to develop depression from being inside 4 walls most of the time. It was miserable not being able to interact with people and being able to go outside. Learning online also made it difficult to focus and time-manage because it was easily available, I would procrastinate most of the time because it was I had time. Same applies to having the lectures recorded and posted afterwards, I did not really concentrate in classes cause I could always go back.
40	The restriction in terms of not being able to physically see your lecturer and classmates.

Respondent	D_Q1_DISLIKED
41	Not being able to interact physically with other students.
42	It was online teaching we did not have contact classes.
43	not interactive and didn't feel interesting at all
44	The lecturer almost always didn't finish the content intended for the lecture.
45	We weren't given enough opportunities to test our knowledge and understand of the module as a whole. We only had class tests (which counted towards our semester mark)
46	It posed certain challenges due to the lockdown
47	Nothing
48	Little to no engagement with fellow students and lecturers. In the department of psychology, we were only provided with narrated power points, and no live BBC sessions.

Appendix L: Coded Qualitative Data: Liked about ERT/L

Code 1:		Recorded Classes
1	R1	It was quite convenient to be able to attend lectures and tutorials from any place with internet access should I have not been able to come to the university due unforeseen circumstances.
2	R2	I enjoyed that the lectures were recorded, so I could pause the lecture, or watch it again. This allowed me to properly absorb the information without feeling time pressure.
3	R4	The fact that the lectures were recorded so that I could go back to them whenever I needed them.
4	R7	It was convenient and easy. It didn't require me having to leave my home and thus I was able to devote more time to studying than I was to making sure I reached classes on time. I was able to rewatch lectures to further my understanding and clarify anything that I wasn't sure about.
5	R11	Online teaching was easy to access and made full usage of the lecturing time efficiently.
6	R12	The easy access of recorded lessons in case I want to refer back for something I missed
7	R15	I was able to review the work when I needed to.
8	R20	We had recordings so I managed to rewatch them to understand the concept better.
9	R22	Having recorded lectures allowed for flexible work hours. Also was a benefit for note-taking, ie. pausing when necessary
10	R24	The availability of videos made by the lectures explaining the content in more detail and the opportunity to have contact sessions if I had questions or wanted face-to-face interaction with the lecture.
11	R26	I liked the fact that my lectures were recorded so i could always look back on what i missed during the online class, which is very helpful since i get multiple chances to reflect on the lessons.
12	R27	I could rewatch the lectures as often as I needed to.
13	R28	I liked that everything was recorded and had access to visiting back and improve my understanding.
14	R31	Recording of lectures
15	R32	The fact that I could rewatch videos and slides if ai struggled to understand the work.
16	R35	It made my learning much easier.
17	R37	That lectures were being recorded and O could access them whenever I want.
18	R41	I liked the fact that lecturers were always willing to try to understand the technology even though it was difficult for some of them because they had not adapted at first.
19	R49	The fact that you could pause or rewind the lectures if you didn't understand something, and rewatch the lectures again before a test to recap.

Code 2:		Manage own time and pace of Learning
1	R3	The ability to manage one's timetable and time to fit their needs
2	R10	The extensive class discussions, time was not limited with online classes
3	R13	It accommodated my learning style which is taking time to process information and making thought through and mostly accurate conclusions, unlike in a contact class where I had to answer a question on the spot.
4	R18	I could devise my own schedule, meaning I was not subjected to a lecture schedule.
5	R21	Working at my own pace
6	R23	It was online and much more convenient. There was way less distractions and I was still able to attend doctors appointments etc. for health reasons which is more difficult back on campus.
7	R29	I got to be taught using a different platform(online) other than contact classes
8	R30	I enjoyed staying at home and doing lectures in my own time.
9	R34	It allowed for a more flexible method of teaching and learning that was more relaxed.
10	R38	I was able to grasp more information and work in my own time at my own pace.
11	R47	It was flexible and innovative. It made learning easier on some concepts

Code 1:		Overlapped
1	R6	that i could work through some of the content in my own time and could study for a semester test i had in the evening during classes and still have the ability to rewatch and catch up the work I missed
2	R9	Freedom of self-study enhanced my learning and also being able to rewatch lectures
3	R14	I enjoyed that it was more self-study but if I struggled I could go back and look at slides/ listen to recorded lectures
4	R17	The easy accessibility to lectures in an online and recorded context and the ability to access the content at times that suited me to view them and make notes. The convenience of reviewing and rewinding lectures in order to digest and understand the content better. and lastly the ease of not having to travel a long distance to campus in order to attend a short lecture that consists of a lot of interruptions due to questions in class detracting from the lecturer to explain all the content planned for that specific lecture.
5	R25	Online learning was a privilege because one had an opportunity to engage with technology more, as a result of online learning. Technology engagement resulted to one being able to know how to navigate through online communication and learning. It also made learning a bit simpler in some instances. I also liked the fact that one did not have to wake up everyday in the morning to attend classes on campus and even if you missed a class, one could watch the recordings which were posted everyday for each module.

Code 1:		Overlapped
6	R39	I liked the fact that I was able to watch pre-recorded videos in my own time and on my own schedule.
7	R40	We could access the content and recorded lectures according to our time and schedule. Answering and asking questions online rather than in person reduced social anxiety and made it easier to interact. It was also in the comfort of our own home.
8	R48	It was always available, recorded if you couldn't attend the classes etc. Resources were posted so you could access at your own time

Code 3:		Interaction
1	R8	It allowed me to engage with my peers which would give me different perspective's on certain topics.
2	R16	It was engaging and all students were given equal opportunity to interact with the topics.
3	R19	Engaging with my fellow peers and lectures
4	R36	It was definitely more one on one and more interactive

Code 2:		Overlapped
1	R5	The content was taught in a very logical, easy to follow way. It was always very clear as to what was needed to know and difficult concepts were highlighted. Modules like GTS251 in particular was very engaging and accommodating to all students. We were provided with past papers, additional learning resources and enrichment content.

Code 4:		Curriculum Structure
1	R42	Class was organized and there was less excuses from the lectures that they are either sick nor have a meeting to attend.

Code 5:		Nothing
1	R44	Nothing much

Code 6:		Disliked
1	R33	I did not really enjoy it at all. I felt that some of my lecturers were not always 'on top of it'.
2	R43	It was online teaching never liked it, because I did not have a laptop it was a big struggle for me.
3	R45	Being on campus allowed students to be interactive and allowed for more understanding.

Code 7:		Not Applicable
1	R46	N/A

Appendix M: Coded Qualitative Data: Disliked about ERT/L

Code 1:		Impersonal / Disconnected / Reduced Interactions
1	R1	For me personally, online teaching and learning is extremely impersonal.
2	R4	Even though it was as interactive as it could be, it did not feel very personal.
3	R6	I found some of the lectures boring to listen to and not very engaging as they would often drone on for an hour in a pre-recorded lecture and go through the exact same in the live lecture
4	R9	Only writing online tests for SLK310 did not feel engaging enough to cover the large volume of work - would have preferred additional assignment-based assessments to engage with the work more.
5	R15	There was a lack of social interaction.
6	R17	You feel quite disconnected from your studies
7	R20	Impersonal
8	R21	It was difficult to stay motivated to keep up to date with lectures. It was a very isolated and one-sided experience.
9	R23	The fast transition from online to on campus test and no communication in what type of questions will be asked (application or theoretical)
10	R26	Sometimes, lecturers would read from the slides which made it feel pointless to listen to the lecture.
11	R30	I felt like I couldn't completely focus in the live classes because I am easily distracted and focus easier in person.
12	R32	I did not like pre-recorded lectures as I felt that I was essentially having to self-study.
13	R33	It was hard not having the option to communicate face to face. The non-contact classes made adapting a bit difficult.
14	R38	I did not like the fact that group discussion was largely missing from the lectures. Despite attempts at live discussion classes, many of these classes were under-attended and the online collaborate space was ultimately not conducive to discussion.
15	R40	The restriction in terms of not being able to physically see your lecturer and classmates.
16	R41	Not being able to interact physically with other students.
17	R42	It was online teaching we did not have contact classes.
18	R43	not interactive and didn't feel interesting at all
19	R48	Little to no engagement with fellow students and lecturers. In the department of psychology, we were only provided with narrated power points, and no live BBC sessions.

Code 2: A lack of Comprehension		
1	R10	Constant interruptions with questions while the teacher was trying to explain something in depth. Another negative was some lecturers did not provide additional resources and weren't able to answer questions fully
2	R13	It limited time to engage with the lecturer. If I had a hard time understanding a concept, it would be close to impossible to ask the lecturer to explain again to me as I would have to take my time and dot down what I need help with, just to avoid taking extra time to try and find the right words to ask the question and go on about what I understand and what I am struggling to understand.
3	R14	That they did not make use of MindTap again like in the first year. Mind tap has convenient features such as activities to do after each chapter
4	R44	The lecturer almost always didn't finish the content intended for the lecture.
5	R45	We were not given enough opportunities to test our knowledge and understand of the module as a whole. We only had class tests (which counted towards our semester mark)

Code 3: A loss of Concentration		
1	R7	It was difficult to stay focused. It was easy to get distracted and I was not able to engage with my peers as much as I would have liked
2	R29	I couldn't concentrate properly online.
3	R31	I felt like I couldn't completely focus in the live classes because I am easily distracted and focus easier in person.

Code 1: Overlapped		
1	R24	The fact that we couldn't make friends easily as how we could have, live. A group of friends one could work with, with regards to helping each other understand the work or the assessments. I also didn't like the idea of how it made some of us lazy to wake up and attend online classes or even study as how we would normally study when we attended contact classes.

Code 4: Technical Issues		
1	R2	The quality of the lecture videos was not always great. Sometimes the slides were not as clear as they could be.
2	R3	Sometimes lecturers didn't manage technical difficulties very well causing the class to fall behind
3	R12	The network issue that disrupts lessons and assessments, tests or quizzes

Code 4: Technical Issues		
4	R19	Some online classes were not recorded so when I had missed it I could not get access of the recording
5	R25	Getting disconnected from the online class because of loashedding or network problems.

Code 2: Overlapped		
1	R39	After having to learn in front of a screen majority of the semester, I developed chronic headaches and bad eye sight. I needed to get classes because it strained my eyes, now I need to wear glasses for up close reading. Times when the Wi-Fi was down made it difficult to access the content. As nice as it was being at home, I started to develop depression from being inside 4 walls most of the time. It was miserable not being able to interact with people and being able to go outside. Learning online also made it difficult to focus and time-manage because it was easily available I would procrastinate most of the time because it was I had time. Same applies to having the lectures recorded and posted afterwards, I didn't really concentrate in classes cause I could always go back.

Code 5: Workload		
1	R8	Sometimes my peers would not engage which meant I would have to take on more workload.
2	R28	There was more academic pressure in terms of workload.
3	R37	The amount of time spent behind my electronic devices.

Code 6: Financial Stressors		
1	R36	That I had to buy my own data to attend classes.

Code 7: Pandemic-related Challenges		
1	R5	The hybridization of on campus and online activities. Either everything should be on campus, or everything should be online, not mixed (at least in my opinion).
2	R46	It posed certain challenges due to the lockdown

Code 8:		Not Applicable
1	R11	N/A
2	R22	N/A
3	R35	N/A

Code 9:		Nothing
1	R18	nothing
2	R27	Nothing
3	R47	Nothing

Code 10:		Liked
1	R16	I generally preferred everything about the online lecture system, due to its convenience.
2	R34	I liked absolutely everything.