FINAL-YEAR MEDICAL STUDENTS' EXPERIENCES AND PERCEPTIONS OF INTEGRATED PRIMARY CARE LEARNING AT DECENTRALISED TRAINING SITES DURING THE COVID-19 PANDEMIC: A MIXED-METHODS STUDY

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DECLARATION

I, Aviva Ruch, student number 8801945P, declare that this research report is my own work. It is being submitted for the degree of Master of Health Sciences Education at the University of the Witwatersrand, Johannesburg, with Human Research Ethics Committee (Medical) clearance number M210938 (Appendix A). It has not been submitted before for any degree or examination at this or any other university.

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Aviva Ruch 18 September 2023

DEDICATION

To my husband, Steven and children, Chanan, Sheina, Micah and Maya

PRESENTATIONS ARISING FROM THIS RESEARCH

Ruch, A. 2022. Promoting self-regulated learning in a final-year online Integrated Primary Care course: A cross-sectional survey. [Poster]. Conference of the Southern African Association of Health Educationalists International Virtual Conference, 27-30 June 2022, South Africa.

George, A. and Ruch, A. 2023. Toward the development of a pedagogical digital competency framework for health professions education. [Oral presentation]. Conference of the Southern African Association of Health Educationalists, 19-21 June 2022, Gqeberha, South Africa.

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ABSTRACT

Background

There is limited data on the effectiveness of online learning to augment theory and clinical knowledge and skills across decentralised training (DCT) sites. This study explored the 2021 cohort of final-year medical students' experiences and perceptions of the integrated primary care (IPC) online teaching and learning across five DCT sites affiliated with the University of the Witwatersrand in South Africa. This information is essential to determine what online IPC teaching and learning should be retained and what adjustments are needed to enhance and standardise IPC online learning across our DCT sites.

IPC is a final-year Bachelor of Medicine and Bachelor of Surgery (MBBCH) subject at Wits University. The subject focuses on primary health care, integrating Internal Medicine, Surgery, Psychiatry, Obstetrics and Gynaecology, Family Medicine, Community Paediatrics and Public Health. Training across different sites poses challenges for standardising learning content and the nature and quality of patient engagement and interaction. The Covid-19 pandemic not only exacerbated the difficulties associated with decentralised teaching and learning, but also decreased student-patient interaction. The rapid shift to emergency remote teaching left teachers with limited time to prepare for online and blended teaching and highlighted shortcomings in some health-professions educators' ability to create meaningful, authentic learning interactions. The study design was underpinned by the Technology Acceptance Model, the Community of Inquiry Model and the Theory of Self-Regulated Learning.

Methods

This explanatory sequential mixed-methods design consisted of a cross-sectional online survey conducted in November 2021, followed by two focus-group discussions in December 2021. The 316 final-year medical students who had completed their IPC block were purposively sampled to participate in this study. Medical students who had

not yet completed the IPC block were excluded from the study. Twenty-one closed- and four open-ended questions explored the students' perceptions of how the online materials supported their learning and augmented their clinical skills and management of patients, their challenges with learning online, and ways to improve the online-learning experience. The closed and open-ended survey answers were analysed using descriptive and inferential statistics and content analysis, respectively. The results of the content analysis are presented graphically. The survey findings informed the questions asked in the focus-group discussions (*n* = 2 and *n* = 3). The discussions were audio-recorded and transcribed verbatim. The transcripts were analysed inductively in MAXQDA. The findings are presented as thematic maps.

Results

The survey response rate was 52% (164/316). The respondents were representative of the study population. Most respondents easily accessed the online content, with more than 70% accessing the online content several times a week. More than 80% found the online content logically organised; the content analysis highlighted three categories of reasons why the online content and interactions influenced their learning. The content analysis also identified three categories of reasons why the online content influenced patient management, but more than a third of respondents remained neutral when asked if the online content introduced them to new clinical skills. Quizzes and tests were the preferred learning method. The features that best supported the respondents' online learning were grouped into five categories: 'Range of activities' (*n* = 73), 'Content selection' (*n* = 56), 'Flexible access to content' (*n* = 8), 'Organisation of content' (*n* = 4) and 'Other' features (*n* = 7). Respondents highlighted several categories that presented challenges to online learning: 'Pedagogical issues' (*n* = 30), 'Excessive workload' (*n* = 27), 'Operational issues' (*n* = 20), 'Learning issues' (*n* = 17), 'Technical issues' (*n* = 11) and 'Unclear course expectations' (*n* = 50). Participants in the focus-group discussions (FGD) concurred with many of the perceptions and experiences of the questionnaire respondents. Three themes were identified in the thematic analysis of the FGD: 'Features supporting learning', 'Challenges of learning online', and 'Ways to improve learning'.

Conclusions

The respondents and focus-group participants displayed a positive attitude to the IPC online content and interactions offered to them during the Covid-19 pandemic. Their experiences and perceptions offered insights to better support learning through practical suggestions for students and faculty, especially around faculty competency to design meaningful learning interactions, both online and blended. While this study focused on IPC, the student recommendations may apply to other subjects nationally and internationally, suggesting the need for further research into using online teaching to support clinical teaching.

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ABBREVIATIONS

CoI: Community of Inquiry
DCT: decentralised training
DFMPC: Department of Family Medicine and Primary Care
ERL: emergency remote learning
FGD: focus-group discussions
GEMP: graduate entry medical programme
HPE: health professions education
ICT: information and computer technology
IPC: integrated primary care
LMS: learning management system
MBBCh: Bachelor of Medicine and Bachelor of Surgery
NSD: no significant difference
OLM: online-learning material
PDC: pedagogical and digital competency
SDL: self-directed learning
SRL: self-regulated learning
TAM: Technology Acceptance Model
UTAUT: theory of acceptance and use of technology
VoPP: voice over PowerPoint
Wits University: University of the Witwatersrand

LIST OF APPENDICES

PERSONAL STATEMENT

When conducting this study, I was the IPC coordinator in the Division of Family Medicine in the Department of Family Medicine and Primary Care at the University of the Witwatersrand. Coordinating the IPC programme involved providing and organising all the academic activities, including assessments and logistic arrangements for the final year medical students during the six-week IPC block.

The shift to emergency remote teaching at the onset of the Covid-19 pandemic was the catalyst I needed to implement some of the university's suggestions for a blended-learning strategy in education. I sourced and created online content and learning interactions to address the possible gaps in student learning resulting from decreased patient contact due to the Covid-19 pandemic. I dedicated enormous time and effort to finding, assessing and creating the online content. I intend to assist students in bridging gaps in their theoretical knowledge and clinical skills and enhance their learning.

I embarked on this study to ascertain if the online content I had sourced and created had enriched the students' experience of IPC by augmenting their theoretical knowledge and clinical skills during the Covid-19 pandemic. I was optimistic that this study's findings would help me evaluate my competencies as a clinical educator teaching online for the first time.

CHAPTER 1. BACKGROUND AND CONTEXT OF THE STUDY

1.1. Introduction

This chapter provides the background, context, and rationale for exploring final-year medical students' experiences and perceptions of integrated primary care (IPC) online learning during their clinical block at decentralised training (DCT) sites during the Covid-19 pandemic. The background covers integrating technology in medical education and the impact of the Covid-19 pandemic on medical teaching and learning, especially clinical training across DCT sites. The national and institutional context is then described, leading to the rationale for the study. Finally, the study aim and research question are unpacked into the objectives to be explored.

1.2. Information and Computer Technology in Education

Global calls for higher education to harness the power of information and computer technology (ICT) in the early 2000s raised government and university awareness of the potential for ICT to enhance teaching and learning (Cross and Adam, 2007). ICT has the potential to offer a broader range of learning opportunities to a wider range of students (Mainka and Benzies, 2006). However, educational ICT uptake is affected by institutional readiness in human and infrastructural resources, often not optimal in low- to middle-income countries (Frehywot et al., 2013). Another factor affecting the uptake of ICT in education is how educators use it (George and Sanders, 2017). ICT usage can increase teaching and learning efficiency, but designing learning interactions in pedagogically sound ways promotes the cognitive engagement needed for meaningful learning (George and Sanders, 2017), where meaningful learning refers to intentional engagement in an authentic learning interaction for knowledge construction (Jonassen, 2008).

Several terms are used interchangeably to refer to ICT use in teaching (Al-araibi et al., 2019; Ingratta et al., 2022; Ruiz, Mintzer and Leipzig, 2006; Shen and Ho, 2020).

These terms include e-learning, digital learning, online learning, web-based learning, technology-mediated or technology-enhanced learning and educational technology. The term ‘e-learning’ has been described as “popular but rather problematic” (Ellaway, 2019, p. 139), while ‘technology-enhanced learning’ has been criticised for suggesting that technology inherently enhances learning (Weston, 2012). The generic term ’online learning’, which refers to delivering educational content through various applications, the internet and multimedia platforms (Singh and Thurman, 2019), will be used in this report to distinguish it from face-to-face or contact learning.

The term ‘blended learning’ has been adopted by many institutions to improve the quality of medical education (Jebraeily et al., 2020). Blended learning promotes a shift from teacher-centred, product-based teaching to a more student-centred, process-based approach (Makhdoom et al., 2013) focused on facilitating learning (Connell and Seville, 2009). However, the ambiguity around interpreting the term necessitates a working definition (Hrastinski, 2019). Blended learning fundamentally combines face-to-face and online learning (Graham, 2006; Ruiz et al., 2006; Vallee et al., 2020) and has been found to provide a better learning outcome than each separate modality (MacNeill et al., 2023; Vallee et al., 2020). There is, however, uncertainty around the extent of online learning that needs to be incorporated to qualify as blended learning. Garrison and Kanuka (2004, p. 96) resist the emphasis on the *extent* of online learning and focus on “the thoughtful integration” of the two modalities as underpinning blended learning’s potential to transform higher education. In this report, blended learning will be used as distinct from either the enhanced classroom use of ICT or fully online learning associated with distance learning, as used by Garrison and Kanuka (2004).

One area that has been overlooked in health professions education (HPE) is using learning theories and frameworks to teach online (MacNeill et al., 2023). Online learning has been misrepresented as inherently constructivist in its learning approach. However, several authors point out that online learning is “just learning” (MacNeill et al., 2023, p. 1), a “learning format” (Vallee et al., 2020, p. 2), and a tool to be used in learning (George and Sanders, 2017). Hrastinski (2009) notes that constructivist and social learning theories inspired online learning. Online learning can, therefore, only be constructivist in approach if designed using constructivist teaching and learning

theories. Garrison and Akyol (2015) suggest that the appropriate use of a framework can contribute to a collaborative-constructivist environment. Using a framework to establish a collaborative-constructivist environment will enrich online learning (Brown, 2014).

1.2.1. Online Learning in Medical Education

Learner preference, developments in software and hardware and curriculum reform have contributed to the rapid evolution of online learning in medical education over the past decade (MacNeill et al., 2023). However, the uptake of online learning has varied across and within medical schools (Ruiz et al., 2006) and has been slower than adoption across other higher-education faculties (MacNeill et al., 2023). Possible reasons for the slow uptake of online learning into medical education include the lack of a single medical-education context. Different medical disciplines train students in different settings, so the effectiveness of online teaching in medical education varies according to the domain being taught and the nature, content, context and learning objectives of the learning event (Cook, 2007). The theoretical knowledge and clinical skills that comprise medical training may also not equally lend themselves to online teaching. For example, neuroanatomy and some clinical skills may be effectively taught online. However, counselling skills and developing patient rapport are best done in person (Cook, 2007; Gormley et al., 2009). Ellaway's emphasis on the importance of what works in a particular context suggests the need for research into contextual factors affecting the design of online and blended-learning interactions since learning context influences the effectiveness of the learning interaction (Ellaway et al., 2014).

Previous studies emphasised medical students' varying perceptions of the effectiveness of online learning. In a 2009 study, some students rated online learning as equivalent to traditional teaching methods for teaching clinical skills (Gormley et al., 2009). In contrast, a recent study reported that some students found online-learning material less engaging and effective than face-to-face teaching (Dost et al., 2020). The shift to online learning during the Covid-19 pandemic resulted in numerous studies exploring student perceptions of online learning. In underdeveloped countries like

Pakistan, students in higher-education institutions faced numerous challenges with using and accessing online learning and thus found online learning less desirable than traditional classes (Adnan and Anwar, 2020). Some higher-education students in Pakistan said they would not like to continue with online learning post-pandemic (Iqbal et al., 2022). A comparative study of online learning in South Africa, Wales and Hungary during the pandemic found different attitudes towards online learning among university students (Cranfield et al., 2021). Younger university students in the Cranfield et al. study preferred face-to-face teaching and found it challenging to engage online. However, despite their age, most students noted that their learning environment and the design of the learning content contributed to their attitude towards learning online and their ability to engage with online content (Cranfield et al., 2021).

Although there is evidence that many undergraduate medical students value online learning of clinical skills, it is uncertain how effective it is for medical education (Pei and Wu, 2019). Gormley et al. (2009) reported positive feedback around online-learning activities positively impacting clinical skills training and motivating students to attend clinical engagements. The students valued different formats of online-learning experiences, including videos, images and checklists and felt that online learning helped to standardise learning (Gormley et al., 2009). Despite all this, the authors noted that students still needed to transfer the online simulated knowledge and skill to actual patient encounters (Gormley et al., 2009). In another study, students and clinical teachers proposed that clinical skills videos "be used for teaching basic concepts, allowing bedside tutorials to focus on applied learning" (George et al., 2019, p. 1). The authors believed that the use of video demonstrations could supplement clinical skills teaching "to large groups of medical students across multiple variably-resourced settings" (George et al., 2019, p. 1). Van Doren et al. (2021) noted similar findings in a post-Covid-19 study exploring students' perceptions of online learning. A note of caution, though, is that online content can only augment clinical training but cannot replace bedside teaching for senior clinical students (Lala et al., 2021).

One of the problems influencing reports of the varying effectiveness of educational technology is the types of studies and the variation in scientific design that have been conducted (Ruiz et al., 2006). Many studies do not define the quality of online content,

the specific online interaction being analysed, or the instructional methodologies used (Ruiz et al., 2006). Studies claiming no significant difference between teaching with and without technology have been criticised for having insufficient power to detect small statistical differences, thus erroneously claiming that technology does not improve learning (Cook and Hatala, 2014; Russell, 1997). More robust studies are needed; Cook and Hatala (2014) suggest that researchers need to conceptualise studies prospectively, appropriately evaluate sample sizes and power and interpret results by measuring the degree of certainty or uncertainty in the sample. In their systematic review, Rowe et al. (2019) reached a similar conclusion about the poor quality of evidence for the effectiveness of open online courses in HPE. Study design is essential to provide evidence for integrating online teaching: the non-inferiority randomised controlled trial by George et al. (2019) found video teaching non-inferior to bedside demonstration of paediatric clinical skills within a 10% margin.

1.2.2. Impact of the Covid-19 Pandemic on Medical Education

The Covid-19 pandemic necessitated some drastic changes to medical education worldwide, providing us with an opportunity to take advantage of the maxim, “never let a good crisis go to waste” (Fuller et al., 2020, p. 781) and to appreciate that many “improvements to medical education are a natural consequence of disruptive moments” (Wayne, Green and Neilson, 2020, p. 2).

Online learning was widely used to mitigate the disruptive effects of the pandemic as global institutions implemented emergency remote learning (ERL) to continue education (Daniel et al., 2021; Gordon et al., 2020). However, online learning had not gained much momentum in sub-Saharan Africa's low- to middle-income countries by 2018, partly due to the unequal global distribution of digital resources (Barteit et al., 2019). Improvements in internet connectivity and mobile networks in sub-Saharan Africa from 2019 onwards mitigated this problem, but the impact of digital divides is still evident (Barteit et al., 2019). Challenges of access to software, hardware and connectivity and digital literacy levels of students and educators remain problematic (Schwartzman, 2020).

During ERL, face-to-face learning was replaced with online learning, with institutions combining synchronous and asynchronous online activities (Daniel et al., 2021; Gordon et al., 2020). Synchronous learning included real-time seminars, tutorials, debates, simulation and clinical skills sessions on online platforms, such as Zoom, Microsoft Teams, WebEx and Skype. Asynchronous learning involves teachers uploading resources like recorded lectures to learning management systems (LMS). Some institutions continued clinical contact through supervised telephonic or video consultations (Daniel et al., 2021). However, ERL underscored the lack of faculty readiness to transition to online learning, with some authors emphasising the urgent need to develop faculty knowledge and skills (Daniel et al., 2021).

1.2.3. Medical Education in South Africa

South African medical education faced several challenges before the Covid-19 pandemic and the rapid transition to online learning. One challenge was the need for our medical schools to shift the demographic of health care professionals to reflect the country and community we serve (Van der Merwe et al., 2016), to train fit-for-practice health practitioners (Kent and De Villiers, 2007; Kiguli-Malwadde et al., 2014). Training health care professionals representative of the country's demographic needs is challenging in the face of under-resourced teaching facilities, under-staffed facilities with over-worked health professionals, hospital budget cuts, an HIV epidemic (Kent and De Villiers, 2007) and an inequitable distribution of health professionals and resources (Dreyer and Rispel, 2021). The current doctor-to-patient ratio is 1:3198, a decline from the 2019 ratio of 1:1266 and far lower than other low-to-middle-income countries (Businesstech, 2022), which underscores the need for more doctors (Strachan, Zabow and Van der Spuy, 2011).

The South African government's White Paper on Health (Department of Health, 1997) attempted to redress the resource inequities by reorientating medical education towards primary health care (Kent and De Villiers, 2007). National faculties of health sciences increased student numbers to address the health professional shortages (Mlambo et al., 2018). However, massifying higher education contributes to several well-documented problems (Hornsby and Osman, 2020; Hornsby, Osman and De

Matos-Ala, 2013). An extended academic platform of DCT sites was developed internationally (Mlambo et al., 2018) and locally (Dreyer and Rispel, 2021) to accommodate the increase in student numbers.

DCT addresses global shortages of medical doctors in rural areas and student congestion (Kibore et al., 2014). There is an increasing body of literature evaluating DCT in many parts of the world (De Villiers, Van Schalkwyk et al., 2017), predominantly in Australia (Dunbabin and Levitt, 2003; Robinson and Slaney, 2013) and North America but increasingly in South Africa and other African countries (De Villiers, Van Schalkwyk et al., 2017; Kebaetse, Nkomazana and Haverkamp, 2014; Kibore et al., 2014). DCT differs from traditional central training in that it occurs across a wide geographical area and in various facilities (primary health care clinics, community health centres or district hospitals) instead of large central tertiary teaching hospitals. Although DCT poses challenges around standardising teaching and patient interaction across different sites, it fosters competency in holistic patient care at a primary level of care. It also exposes students to primary health care, rural medicine, and working in under-resourced facilities (Mlambo et al., 2018). DCT shifts the healthcare system's focus from secondary and tertiary care to primary care, training students to be fit for purpose (Hoffmann et al., 2019), as espoused in the 1978 Declaration of Alma Ata of the World Health Organisation. The South African DCT platform offers unique training and learning opportunities in the discipline of primary care (Dreyer and Rispel, 2021), addresses congested tertiary clinical platforms and faculty shortages (Kibore et al., 2014), and offers students an opportunity to work in under-resourced settings, thereby promoting the appropriate use of medical resources (Hoffmann et al., 2019), a competency that students might not otherwise develop in current general medical training (De Villiers, Blitz et al., 2017).

Online learning is essential for successful DCT (De Villiers, Blitz et al., 2017; Ingratta et al., 2022). Online learning promotes standardisation and access to learning resources. In Botswana, online learning helped address faculty shortages across DCT sites and encouraged collaboration and communication between learners, experts and peers (Kebaetse et al., 2014). In South Africa, researchers from several universities recognised online learning as a tool to assist medical students in developing common

core competencies and, more particularly, address the challenges of training medical students placed at sites away from the central university teaching platform (De Villiers, Van Schalkwyk et al., 2017; De Villiers, Blitz et al., 2017).

1.3. Blended Learning at the University of the Witwatersrand

The University of the Witwatersrand (Wits University) prioritised blended learning in planning and strategy documents like the 2015–2019 Learning and Teaching Plan and the current Wits Digital Learning and Teaching Strategy (University of the Witwatersrand, 2019). Although some departments seized the opportunity to use online learning to address resource shortages by, for example, introducing clinical skills videos that allowed more time for bedside teaching in paediatric wards and could supplement and standardise the educational offering to large groups of undergraduate medical students (George et al., 2019), the integration of blended learning was varied across the faculty, especially in clinical teaching.

Wits University implemented ERL within three weeks of the government-imposed lockdown in March 2020 that formed part of the response to the Covid-19 pandemic. The university provided intensive online staff training on digital teaching using primarily Microsoft Teams and the learning management system (LMS) used at the time, Sakai[1]. The online staff training focused on several online teaching formats, including creating voice over PowerPoint (VoPP) presentations and using Microsoft Teams for resource sharing and synchronous teaching. The ERL training for educators focused on the tools necessary to continue teaching and learning without sufficient emphasis on critical pedagogical and digital competencies required for designing effective learning interactions, that is, learning interactions that promote meaningful learning.

Instructional design involves the systematic planning, development, execution, and evaluation of learning experiences (MacNeill et al., 2023). The design of an online-learning interaction has been noted as fundamental to its success (Masters and

[1] During 2020, the University transitioned from onsite-storage of Sakai to cloud-based hosting because of ongoing problems with Sakai that were highlighted during ERL (Banda, 2020). In early 2021, *ulwazi*, an iteration of Canvas, replaced Sakai as the institutional LMS.

Ellaway, 2008). Skantz-Åberg et al. (2022) reiterate that educational design is critical to effective teaching and learning but point out the ambiguity around the digital competencies teachers need to design effective learning interactions. 'Digital competence' is the overarching term because it incorporates the various literacies required for using technologies (Redecker and Punie, 2017) and relates to performance (what people should be able to do with technology) (Falloon, 2020; Janssen et al., 2013). However, digital competence alone is insufficient for effective online teaching (Janssen et al., 2013). From (2017) uses the term 'pedagogical digital competence' (PDC) to represent the complexity of what teachers must do to teach effectively online. He defines PDC as:

> "…*the ability to consistently apply the attitudes, knowledge and skills required to plan and conduct, and to evaluate and revise on an ongoing basis, ICT-supported teaching, based on theory, current research and proven experience to support students' learning in the best possible way*." *(From, 2017).*

The concept of PDC is based on integrating the types of knowledge, skills, attitudes and values teachers must have to teach a subject effectively and improves with experience (From, 2017).

1.4. Rationale for the Study

Family Medicine, in the form of IPC during the final year of the Wits University Bachelor of Medicine and Bachelor of Surgery (MBBCh) programme, is a fundamental discipline in the South African medical curriculum because of the desperate need to shift to a generalist approach to medicine in our country (Kent and De Villiers, 2007). The discipline combines the fundamental medical disciplines of Internal Medicine, Surgery, Psychiatry, Obstetrics and Gynaecology, Family Medicine, Community Paediatrics and Public Health, focused on primary health care.

Wits University offers final-year medical students an integrated primary health care programme coordinated by the Department of Family Medicine and Primary Care (DFMPC). Other universities similarly empahasise primary health care exposure. For example, Stellenbosch University, offers an integrated longitudinal clerkship to final-year medical students.

Wits University allows graduates to join in the third year of the MBBCh, after which the programme is known as the Graduate Entry Medical Programme or GEMP. IPC is one of eight teaching blocks in GEMP IV. The block involves training at 12 DCT sites across Johannesburg Metropolitan, Ekurhuleni, the West Rand, Dr Kenneth Kaunda District in the Northwest Province, and Tintswalo Hospital and surrounding clinics in Mpumalanga Province.

Coordinating the IPC block across the DCT sites, already challenging before the pandemic, became more difficult after the mandated move to ERL. The IPC block is one of the few times students are exposed to generalist medicine at a grassroots level in a primary healthcare setting, and it is often the first time they must manage their patients with distant supervision. Despite the university promoting blended learning, and the potential for online learning to standardise DCT, the DFMPC had primarily used the LMS as a tool for student communication, logistic arrangements and a repository of learning content before ERL. As the coordinator for this block, I was thus unprepared to transition online in a short space of time.

Some authors believe that it is unlikely that we will return to pre-Covid-19 teaching methods since the adoption of online learning during the pandemic suggested that ICT can be used to achieve many teaching and learning objectives (Wayne et al., 2020). Henderson, Selwyn and Ashton (2017), assert that it is imperative to explore the students' experiences and perceptions of online learning to understand the realities of their encounters and plan an improved way of strategically using online learning in a practical approach to blended learning. Although ERL has been criticised for not exemplifying good online teaching because of the lack of time for teachers to design effective learning interactions, the crisis has made us rethink how we teach. This study interrogates students' perceptions and experiences of IPC online learning during ERL.

1.5. Aim, Research Question and Objectives

The aim of this study was to determine final-year medical students' experiences and perceptions of learning IPC across DCT sites during the Covid-19 pandemic at the University of the Witwatersrand in 2021. The findings would be used to improve the online content and online interaction design to augment theoretical knowledge and clinical skills.

The research question for the study was:
What were the final-year medical students' experiences and perceptions of learning IPC across DCT sites during the Covid-19 pandemic at the University of Witwatersrand in 2021?

The study objectives were the following:
1. To explore the frequency and nature of students' usage of online-learning material (OLM).
2. To explore to what extent the OLM augmented students' theoretical learning.
3. To explore to what extent the OLM augmented students' clinical skills.
4. To explore students' perceptions of how the OLM could be improved to better support learning.

1.6. Conclusion

This chapter provided the background and context of this study relating to the challenges facing medical education in South Africa and the impact of the Covid-19 pandemic. The rationale, aim and objectives for the study were outlined. The next chapter introduces relevant models and concepts used to guide the study.

CHAPTER 2. CONCEPTUAL FRAMEWORK FOR THE STUDY

2.1. Introduction

This chapter discusses the function and purpose of conceptual frameworks and the models and theories that informed this study.

2.2. Conceptual Frameworks

Maxwell (2005, p. 33) defined a conceptual framework as “the system of concepts, assumptions, expectations, beliefs and theories that supports and informs your research”. Conceptual frameworks consider the researcher’s ideas and beliefs about the observed phenomenon and are a conception of what will be studied to inform the study design (Maxwell, 2005).

Conceptual frameworks are developed, not identified, and can be presented graphically and narratively. Antonenko (2015, p. 57) describes a conceptual framework as “something that is carefully *assembled* piece by piece by the researcher rather than any one ready to use theory or model from the literature”. Although some authors, for example, Miles and Huberman (1994), emphasise the value of graphic conceptual frameworks in mapping the relationships between concepts, conceptual frameworks may also be narrative (Antonenko, 2015).

2.2.1. Functions of Conceptual Frameworks

Conceptual frameworks situate research within a particular academic discipline by drawing on discipline-specific concepts (Passmore, 1997) relevant to the phenomenon under investigation (Merriam, 2001). The use of conceptual frameworks thus links existing theory to current practice, an omission for which both general educational research (Austin, 2009; Boot and Beile, 2005) and medical education research have been found lacking (Cook and Hatala, 2014).

Conceptual frameworks delineate the boundaries of a study, link the elements of the research process, and ultimately allow the researcher to explain the critical factors involved in the study (Ravitch and Mittenfelner Carl, 2020). These critical factors include justification of the research problem, a definition of relevant concepts, the establishment of theoretical and empirical rationale, the selection of an appropriate method and the tool to interpret results relative to established theory (Ravitch and Mittenfelner Carl, 2020). In this way, conceptual frameworks provide a foundation for the study and a point of reference for the findings.

2.3. The Models and Theory that Informed this Study

The study's objectives related to the perceived usefulness, ease of use, relevance and use of the IPC online content and interactions. Relevant aspects of the Technology Acceptance Model (TAM), the Community of Inquiry (CoI) model and the Theory of Self-Regulatory Learning (SRL) were integrated to inform this study.

2.3.1. Technology Acceptance Model

The TAM, initially developed by Davis in 1986 during his doctoral studies, has been used extensively in research on the use and acceptance of technology and is regarded as the leading model to explain and predict system use (Chuttur, 2007).

Originally based on the Theory of Reasoned Action (Ajzen and Fishbein, 1977), the TAM (see Figure 2.1) explains the reasons for accepting technology and attempts to predict the behaviour and successful implementation of technology (Marikyan and Papagiannidis, 2022). The Theory of Reasoned Action described attitudes and subjective norms as influencing behavioural intentions and behaviours relating to technology use (Lai, 2017), but it did not measure factors related to *acceptance* of technology use (Marikyan and Papgiannidis, 2022). TAM was developed to examine users' technology acceptance (Lai, 2017). According to this model, *perceived usefulness* and *ease of use* directly affect users' behavioural *intention* to use technology (Lai, 2017), ultimately influencing their use of the system. *Perceived*

usefulness refers to “the degree to which an individual believes that using a particular system would enhance his or her job performance”, while *perceived ease of use* represents “the degree to which an individual believes a particular system would be free of physical and mental effort” (Chuttur, 2007, p 5).

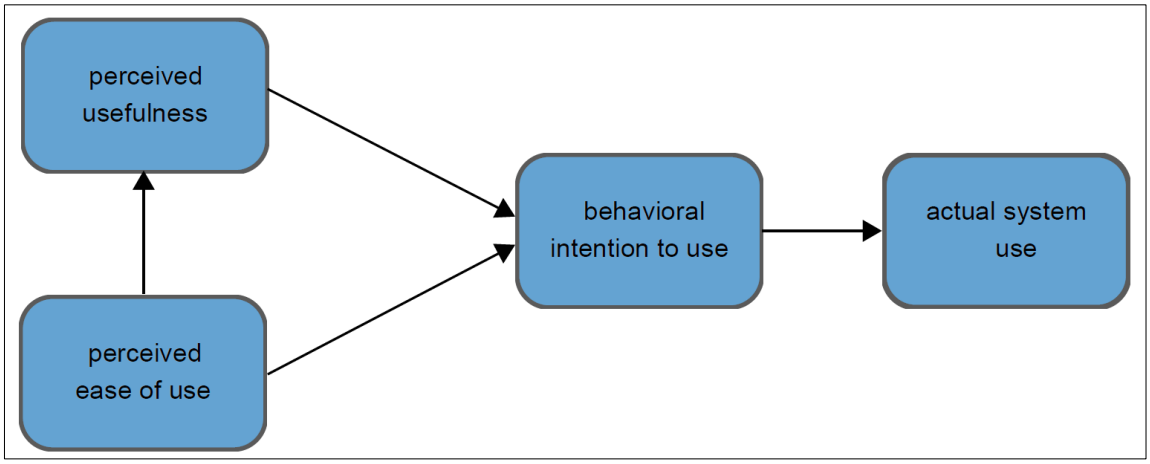

Figure 2.1 Technology Acceptance Model (Davis, 1989)

The TAM has undergone numerous iterations and revisions based on perceived shortfalls (Marikyan and Papgiannidis, 2022). For example, Bagozzi (2007) declared that the TAM might not accurately determine the actual use of technology based on perceived usefulness and perceived ease of use (Chuttur, 2007). Another concern was that identifying what made the model helpful was not addressed (Marikyan and Papagiannidis, 2023). The TAM 2 and TAM 3 iterations expanded the original TAM model by exploring factors contributing to the users’ perceived usefulness and ease of use of technology (Marikyan and Papagiannidis, 2022). The extended TAM had other limitations, such as the context in which the model was used and the measurement of intended use based on self-reporting introduced possible bias (Marikyan and Papagiannidis, 2023). Venkatesh et al. (2003) proposed the unified theory of acceptance and use of technology (UTAUT) model, which built on the previous models (Lai, 2017) and proposed to explore not only the ability of users to accept technology but also their intention to adopt new technologies (Momani, 2020).

Despite its perceived shortcomings, the original TAM is still widely used in determining the acceptability of new technology and its intended use (Lai, 2017; Marikyan and Papagiannidis, 2023). The TAM’s focus on *perceived usefulness* and *perceived ease*

of use directly affects user acceptance of technology (Lai, 2017; Chuttur, 2009) and is relevant to my work.

2.3.2. Community of Inquiry Model

Like the TAM, the Community of Inquiry (CoI) model has been used extensively in research into online and blended-learning contexts (Garrison, Cleveland-Innes and Fung, 2010; MacNeill et al., 2023). Advances in educational technologies have facilitated a shift to collaborative and community approaches to online and blended learning because of increased evidence of its effectiveness and improved student satisfaction (Garrison and Akyol, 2015).

The CoI model nurtures a collaborative constructivist learning approach by focusing on the interaction of three core elements (Garrison, Anderson and Archer, 1999): cognitive presence, social presence and teaching presence (see Figure 2.2).

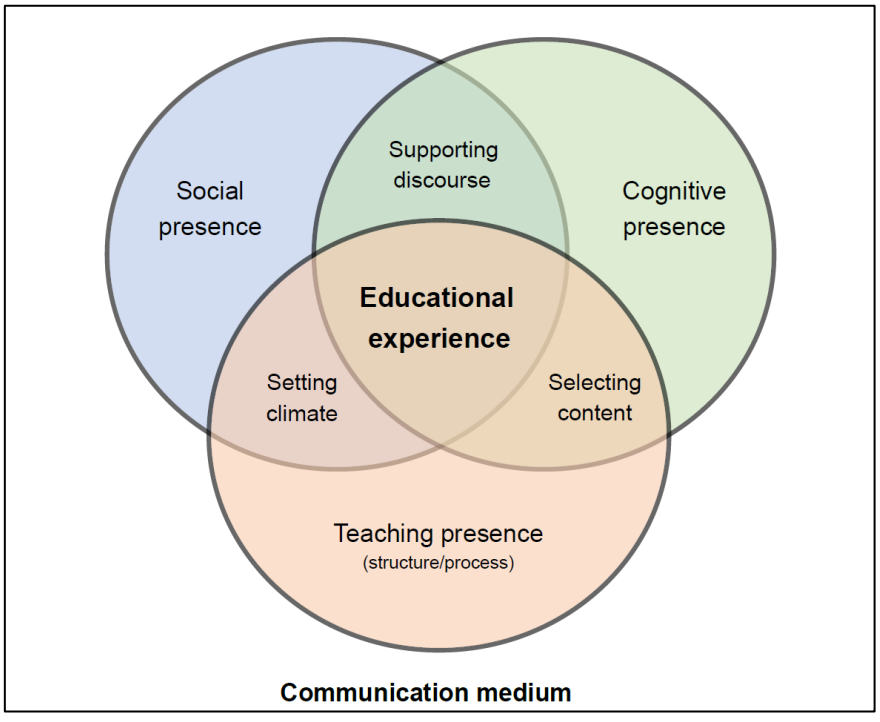

Figure 2.2 Community of Inquiry Model (Garrison et al., 1999)

Cognitive presence refers to the students' ability to construct meaning through communication. It involves the students' ability to think critically and use the content

input meaningfully. *Social presence* refers to the students' ability to present themselves to the community as actual live participants in the community of learning. The social presence supports the cognitive presence by facilitating interaction and fostering critical thinking around learning topics and experiences. The support of the social presence in the cognitive presence contributes directly to the success of the learning interaction. The primary educator mainly undertakes the dual functions of the construct-teaching presence but can be supported by other educators in the community. The first function is the educational experience's design, including content selection, course and content organisation, the delivery of the course material, and the design and development of assessment activities. The second function involves facilitation, which supports and enhances cognitive and social presence. The teacher or facilitator is also responsible for fostering a safe and engaging learning environment to enhance social presence (Shea and Bidjerano, 2009). These three presences do not exist in isolation but are critically essential in the CoI model (Shea and Bidjerano, 2009) to ensure quality educational experiences.

2.3.3. Self-Regulated Learning

Online learning prompted a shift to applying more adult learning theories in higher education (Ruiz et al., 2006). Self-directed learning (SDL) became more relevant with increased online teaching and learning (Saks and Leijen, 2014). Knowles (1975) described SDL as a process in which students identify their learning needs and form their own learning goals and strategies to achieve and evaluate the learning outcomes.

SDL and self-regulated learning (SRL) are commonly used interchangeably (Gandomkar and Sandars, 2018). Although SDL and SRL are similar in several aspects, there are distinct differences. Understanding the similarities and differences between SDL and SRL is essential for clarifying what is being discussed. Both SDL and SRL require active learner participation, goal-directed learners with intrinsic motivation, and metacognition, and each consists of four key phases: defining tasks, setting and planning goals, enacting a strategy and monitoring and reflecting on the learning (Saks and Leijne, 2014).

SRL is commonly used in formal teaching environments, where teachers or facilitators plan learning events and assessments (Saks and Leijne, 2014). The learner is, however, an active participant in the learning process in which they are required to self-monitor their progress (Sandars, 2013). SRL enhances facilitated teaching (Durning et al., 2011), which is more suited to undergraduate education. SDL, in contrast, usually occurs outside of traditional learning environments and requires learners to design their learning environment and plan their learning trajectories (Saks and Leijne, 2014). This type of learning is best suited to adult learners who take responsibility for their learning and can self-regulate it (Saks and Leijne, 2014).

There are several definitions of self-regulation theories in learning. Vancouver (2018) cites DeShon and Rench (2009) and Zeidner, Boekaerts and Pintrich (2000) in explaining that self-regulation is not a simple process model but rather a paradigm or meta-theory about motivation and satisfaction with one's achievements and attainment of goals. Bandura (1991) includes self-regulation as a central role in his social cognitive theory (Vancouver, 2018). Bandura (1991) explains that self-regulation provides the basis for action with purpose, which requires forethought and, in turn, provides the motivation learners require to guide their performance.

The meta-theory of SRL I have used in this research report focuses on the learning process concerning a clearly defined task and uses cognitive and metacognitive processes to ensure the intended learning outcome is achieved (Zimmerman and Schunk, 2011). Metacognition supports acquiring and retaining knowledge and skills by focusing on the learning process (Moos and Ringdal, 2012). Zimmerman's Cycle of Self-Regulated Learning identifies three definite phases in the learning process: forethought, performance and self-reflection (see Figure 2.3). In this cycle, each phase aims to enhance learner planning, self-monitoring and self-reflection to make changes to the performance of the task and the goal (Cheng, 2011). Moos and Ringdal (2012) suggest that SRL can be optimised with technology, particularly in the online-learning environment.

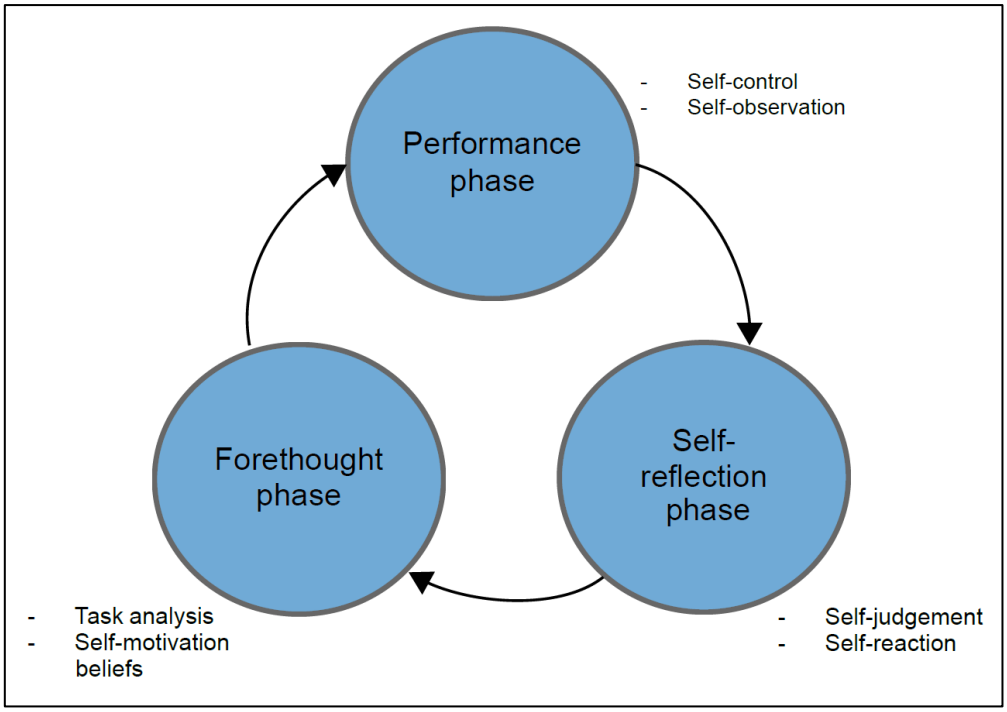

Figure 2.3 A cyclical phase model of self-regulation (Zimmerman and Moylan, 2009)

SRL is relevant to my study for several reasons. First, SRL is suited to the undergraduate space, as indicated earlier in this section. Second, SRL requires the teacher, cognitive, and social presence described in the CoI model. The teacher presence aligns with the presence of a teacher or facilitator to guide and plan learning events and assessments. The cognitive presence aligns with the taught performance of a skill or display of knowledge and the self-reflection and self-evaluation that fits with the self-reflection of the SRL cycle. The social presence is not overtly evident in the cycle of self-regulated learning. However, social interaction is integral to authentic medical education and is present during the performance of a skill or demonstration of knowledge (Yardley et al., 2013). The literature highlights that online learning is a suitable environment for SRL (Moos and Ringdal, 2012; Saks and Leijen, 2014) since tasks are set and planned by teachers and facilitators, but the learner needs to have self-motivation to engage with and participate in the learning interaction. The online space offers learners the flexibility to engage with the material at their own time and therefore relies on learner planning, strategy and self-reflection to accomplish a task or skill, thus making this the third reason for including SRL in the conceptual framework. My fourth reason for including SRL theory in my framework is that SRL is a learning process that can be used by struggling and high-achieving students alike

(Durning et al., 2011; Sandars and Cleary, 2011). Lastly, SRL is closely related to learners' ability to organise their learning with adequate time and information management (Cheng, 2011). Developing the capability to learn effectively improves learner performance and lifelong learning (Cheng, 2011). Sandars (2013) reiterates this by suggesting that the SRL process can potentially encourage and develop lifelong learners.

2.4. Conclusion

The inclusion of the TAM, CoI model and SRL theory in the development of this conceptual framework allowed me to link theory and current practice. The TAM assisted in exploring the acceptability of using an online platform for teaching and learning. The CoI model assisted in highlighting which elements were core to nurturing a collaborative constructivist learning approach using online learning. The theory of SRL added a dimension of adult learning to the conceptual framework which is increasingly relevant in online learning. The links made between the theory and practice in the development of the conceptual framework allowed me to explore the research objectives relating to accessibility, selection and organisation of content as a way to augment existing teaching and learning and a way to explore areas in which the online content could be improved. The next chapter details the method used in this study.

CHAPTER 3. METHODS

3.1. Introduction

This chapter will focus on the research methods to address the objectives. The chapter starts with the philosophical underpinnings for the study and describes the study design, including the sampling, data collection, and analysis strategies. Finally, the ethical considerations and methods used to improve the study's rigour will be discussed.

3.2. Research Paradigm

A research paradigm is a belief system or worldview that guides research (Kivunja and Kuyini, 2017; Taylor and Medina, 2011). A researcher’s paradigm influences what the researcher studies, how it should be studied and how the study results should be interpreted.

Research paradigms comprise four philosophical elements: ontology, epistemology, methodology and axiology (Kivunja and Kuyini, 2017). Ontology can be understood by exploring the nature of being or examining your belief about reality and existence (Creswell and Plano Clark, 2018; Crotty, 1998; Kivunja and Kuyini, 2017; Scotland, 2012). Understanding the ontology in the research context allows the researcher to examine their beliefs, which is crucial to understanding your research data.

Epistemology is concerned with studying knowledge and exploring what counts as knowledge in the world (Creswell and Plano Clark, 2018; Crotty, 1998; Guba and Lincoln, 1994; Kivunja and Kuyini, 2017). Understanding what is considered knowledge allows the researcher to extend and broaden their understanding of the study (Kivunja and Kuyini, 2017).

Methodology refers to the research design, methods and approach used and allows a logical flow of the research process (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017). Axiology considers the ethical issues and value system that influence

the researcher. The researcher's axiology influences the evaluation and understanding of ethical and unethical decisions relating to research (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017).

Tashakkori and Teddlie (2003), in Kivunja and Kuyini (2017), propose four dominant paradigms in educational research. The first is the positivist paradigm, which explores the cause-and-effect relationship in nature and interprets findings as measurable units or facts. This paradigm involves logical deduction, formulation, and testing of hypotheses that result in a conclusion or outcome (Kivunja and Kuyini, 2017; Taylor and Medina, 2011). The epistemology of a positivist paradigm is objectivist, which implies that research can assist in gaining knowledge that resembles the fundamental nature of the phenomenon being investigated. The positivist has a naïve realist ontology based on the belief that reality is the same for everyone and context has no bearing on what is real (Creswell, 2008; Kivunja and Kuyini, 2017; Taylor and Medina, 2011). Positivist research is best undertaken using quantitative methods, as the focus is on the outcome of the experiment or research.

The post-positivist paradigm is derived from the positivist paradigm and accepts that truth is not absolute and cannot be fully understood. Post-positivism accepts that research can be conducted through observation without experimentation or formulating a hypothesis (Creswell, 2008; Kivunja and Kuyini, 2017; Taylor and Medina, 2011). Therefore, this derivative of positivism is used more frequently in research exploring human behaviour in the context of educational research.

Constructivism or interpretivism is the second research paradigm explained in this chapter. This paradigm is concerned with making meaning of the research context and understanding and interpreting what the participants think. Interpretivism has a subjectivist epistemology which implies that the researcher constructs knowledge about the data through their thoughts and interactions with the research participants (Creswell and Creswell, 2018; Kivunja and Kuyini, 2017; Taylor and Medina, 2011). The interpretivist believes that each situation has multiple realities and that meaning is constructed through interactions between researchers and participants and among participants themselves (Creswell and Creswell, 2018; Kivunja and Kuyini, 2017;

Taylor and Medina, 2011). The ontology applicable to interpretivism is called a relativist ontological stance. Studies undertaken in this paradigm are usually qualitative (Creswell and Creswell, 2018; Kivunja and Kuyini, 2017; Taylor and Medina, 2011), meaning that this kind of research produces findings not determined by statistical or numerical quantification but rather by understanding the phenomenon or behaviour of the research participants (Cypress, 2015).

A transformative or critical research paradigm focuses on social-justice issues. Researchers deliberately attempt to address human-rights issues and issues of power and oppression (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017). It has a transactional epistemology in which the researcher interacts with the participants rather than observing them, to construct knowledge (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017). The ontology is that of historical realism in which the belief is that social reality is bound by history and changes depending on political, social and cultural factors (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017). The research methods employed by this research paradigm are usually qualitative but also mixed (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017).

Finally, the pragmatic paradigm concerns what works (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017) rather than what is seen as true or reality (Kivunja and Kuyini, 2017; Weaver, 2018). Its epistemology is unique in that it is not static but based on understanding knowledge as a lived experience (Kaushik and Walsh, 2019). Pragmatism is a relational epistemology since the researcher decides what is appropriate to study (Kivunja and Kuyini, 2017). The pragmatic paradigm has a non-singular reality ontology, implying that there is no single reality, with individuals having their own beliefs of what is real and how to interpret their own reality (Creswell and Plano Clark, 2018; Kivunja and Kuyini, 2017). Researchers within the pragmatic paradigm are thus not limited to the data-collection methods or analysis strategies associated with the traditional positivist or post-positivist paradigms (Mertens, 2004). Researchers in the pragmatic paradigm select and combine data-collection methods according to their suitability for answering research questions (Creswell and Plano Clark, 2018).

The researcher is situated in the pragmatic paradigm because it focuses on the practical application of the research findings. This positioning allows the researcher to integrate different data-collection and analysis methods to offer the best solution for analysing the research data to solve the research problem (Johnson and Onwuegbuzie, 2004). The study's design and methods have thus been selected to answer the research questions (Gorard and Taylor, 2004; Mertens, 2004), using qualitative and quantitative data-collection and analysis methods where appropriate.

3.3. Research Design

Research design describes the type of enquiry that the study is undertaking. It assists in giving the enquiry a quantitative, qualitative or mixed-methods approach. Denzin and Lincoln (2011) suggest that research design can be viewed as the strategy of the enquiry. The decision of which research design to use is therefore critical because it affects the type of data collected and how it is collected, analysed and presented.

When conducting a study, it is vital to appreciate that the research paradigm, research design, methods, and objectives are interconnected.

3.3.1. Mixed Methods Studies

Mixed methods research needs to include a diversity of viewpoints, and the core characteristics of mixed methods should be used to define the design of such studies (Creswell and Plano Clark, 2018). These core characteristics are collecting and analysing the quantitative and qualitative data with the research question in mind, integrating the quantitative and qualitative results, organising procedures to ensure that the study is conducted logically and assuring that philosophy and theory frame the procedures.

Mixed methods research is a process in which the “researcher or team of researchers combines elements of qualitative and quantitative research approaches … for the purposes of breadth and depth of understanding and corroboration.” (Johnson and Onwuegbuzie, 2007, p. 123). Collecting quantitative and qualitative data addresses

the inherent biases and weaknesses of the individual types of data collection; it provides more evidence, since both data-collection types are used and offers insights into the data beyond the one type of data collection (Creswell and Plano Clark, 2018).

Creswell and Creswell (2018) recognise three primary mixed-methods research designs:

- Convergent designs in which quantitative and qualitative data are merged to provide a comprehensive, integrated analysis and presentation of the findings.
- Explanatory sequential designs in which the quantitative data is collected and analysed before the qualitative, and the qualitative data explains the quantitative findings.
- Exploratory sequential designs in which the research question is usually explored using a qualitative approach, the data is analysed, and the qualitative findings are used to build an instrument for the quantitative part of the study.

3.3.2. Study Design

This study uses an explanatory sequential mixed-methods design (Etikan, 2016), which involves collecting and analysing quantitative data, the results of which will then be explained in more detail with follow-up qualitative research (Creswell and Creswell, 2018). An explanatory sequential mixed-methods design can help explain unexpected results from the quantitative phase of a study; however, the limitations of this design are the time required and the feasibility of resources to collect and analyse both types of data (Morse, 1991). Another potential problem is that the quantitative and qualitative data must be integrated effectively (DeCuir-Gunby and Schutz, 2017).

Explanatory sequential mixed-methods research studies typically involve two phases. The first phase of this study involved collecting data using an online questionnaire comprising closed- and open-ended questions. In the study's second phase, focus-group discussions were conducted with volunteers from the study cohort. The questionnaire findings informed the type of questions posed to the focus-group participants. The interview questions were developed to explain and explore more

deeply the aspects of the online content and interactions that were found to support learning, posed challenges to learning or that highlighted areas to improve learning using the online content. The qualitative and quantitative data were then integrated to answer the research objectives.

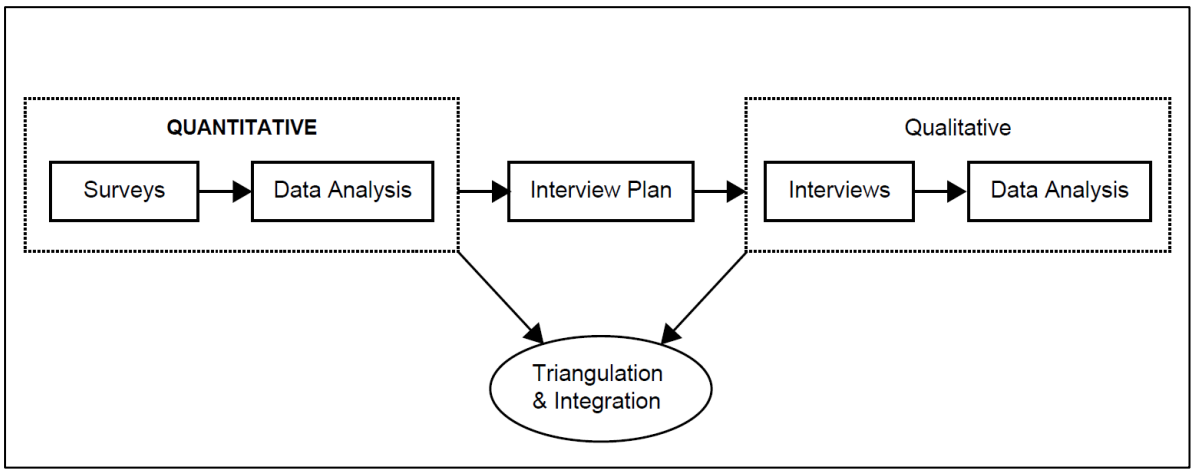

Figure 3.1 Explanatory sequential mixed-methods design (Wu, 2012)

3.4. Phase 1: Online Survey

3.4.1. Participant Selection and Sampling Strategy

For the study's first phase, 316 GEMP IV medical students registered at the university in 2021 who had completed the IPC block were eligible to participate. GEMP IV students who had not yet completed their IPC block in 2021 and were asynchronous with the class were excluded from the study. The 316 medical students constituted a purposive sample (Etikan, 2016); they were uniquely positioned to provide feedback on using the online IPC teaching and learning materials during 2021.

An estimated sample size of 176 students was calculated using a confidence interval of 95% with a 5% margin of error, which will require a response rate of 54% from the students. Response rates for online questionnaires are often low, ranging between 21% and 30% (Sax, Gilmartin and Bryant, 2003). The response rate to our survey was 52%, which approximates the required response rate.

3.4.2. Data Collection

Questionnaires are the most effective and efficient tool to capture data with a relatively quick turnaround time (Creswell and Creswell, 2018). An online questionnaire was developed to explore the participants' experiences and perceptions of online IPC learning in the short time between completing their examinations and graduation. Shortly after graduation, the students take up internship positions at different locations nationwide. The questionnaire thus had to be administered between the end of the IPC examinations (mid-November 2021) and graduation (early December 2021).

Development of the Instrument

The instrument used in this study, the questionnaire, explores what directed student learning. To ensure clarity, when the respondents are asked if the online content and interactions directed their learning, it should be taken to mean whether the online content and interactions guided their learning. The word *directed* was only used to make it more straightforward for the respondents answering the questionnaire, since asking about the regulation of their learning may not have given clear direction on how to answer the question.

The online questionnaire was developed in REDCap (Research Electronic Data Capture). The 25 questions about students' experiences and perceptions of learning online during the IPC block included a five-point Likert scale, yes-no-neutral, and four open-ended questions. Open-ended questions contribute to the "preliminary understanding" of phenomena (LaDonna, Taylor and Lingard, 2018, p. 7), so they were appropriate to identify areas for further probing in the focus-group discussions. O'Cathain and Thomas (2004, p.7) advise that 'general open-ended questions' should not be used to make surveys more interesting and discourage the use of questions asking participants to provide "any other comments". Other authors do not regard open-ended answers as constituting rigorous qualitative research or suitable to publish as 'stand-alone findings' (LaDonna et al., 2018).. However, appropriate open-ended questions allow participants to expand on their thoughts and beliefs (Reja et al., 2003). The questions were face-validated (Creswell and Creswell, 2018) by two experienced researchers to improve the validity of the survey. The experienced researchers

checked the wording and sequence of the questions. A pilot study conducted in early November 2021 with ten volunteers from the GEMP IV 2020 population was used to improve the readability and clarity of the questions.

The first page of the questionnaire (see Appendix A) consisted of the informed consent. Students were not permitted to access the survey without providing consent. The questionnaire consisted of five sections. The first section was adapted from the TAM (Davis, 1989). The original basic TAM questionnaire posed questions about the perceived usefulness of technology to improve job performance, productivity and effectiveness and asked about perceived ease of use of operating the technology and acquiring the skill to use the technology. These questions were modified in our questionnaire to explore the *perceived usefulness* and *ease of use* in the context of this cohort of study participants, since I was only interested in the participants' frequency and nature of the use of the online content and interactions. The seven questions in the first section explored the participants' experiences and perceptions of the online content's usefulness and ease of use. Two questions were asked about their reasons for accessing the online content and the usefulness of accessing the online content and interactions to prepare for assessments. These questions were created to give insight into the student's attitudes and acceptance of using online learning.

The following sections, comprising sixteen questions, explored the participants' experiences and perceptions of the relevance and application of the online content and whether the online content and interactions augmented their clinical skills. The participants were also asked which learning formats (for example, quizzes and videos) they would like to use more. The questions were face-validated (Creswell and Creswell, 2018) by an experienced researcher, who ensured that the questions aligned with the study's objectives. The CoI model provided the theoretical underpinning for exploring these questions, noting that worthwhile learning occurs in a community (Garrison et al., 1999). Exploring the cognitive presence (the content delivered online), social presence (the involvement and interaction of the students) and teacher presence (the involvement in content delivery and coordination and facilitation of learning interactions) in online content reinforced the notion of the value

of learning in a community (Garrison et al., 1999). The fifth section of the online questionnaire was used to collect demographic data to ensure that the data collected was representative of the diverse study population.

Administering the Questionnaire

Permission to access the students' email addresses was obtained from the university registrar. The faculty's Unit for Undergraduate Medical Education provided the email addresses.

The survey link was emailed to the students on 11 November 2021, with weekly reminders until the survey was closed on 30 November 2021. REDCap uses IP addresses, not email addresses, to prevent duplicate entries, thus preserving student anonymity. Participants were requested to provide informed consent on the first page before proceeding with the survey.

3.4.3. Analysis and Reporting of the Questionnaire Data

The closed-ended data were exported to Stata 15 for descriptive and inferential analysis. Race was reported as a demographic category but was not used as an analytical category. Inferential techniques included the use of correlations and associations tested using chi-squared tests. The Fisher's Exact Test was reported where expected counts were less than 5%. All tests were conducted at a significance level of $p \leq 0.05$. The Likert-scale categories 'agree' and 'strongly agree' and 'disagree' and 'strongly disagree' were aggregated and are reported as 'agree' and 'disagree'.

The responses to the open-ended questions were transferred to Microsoft Excel for content analysis. Content analysis allows data to be analysed qualitatively and quantified (Vaismoradi, Turunen and Bondas, 2013). This type of analysis uses a descriptive approach for coding and interpreting the frequency counts derived (Grbich, 2007; Vaismoradi et al., 2013).

In this study, the researcher open-coded the short-answer responses to each open-ended question, question-by-question, as described by Bazeley (2013). Open coding

or initial coding refers to the first cycle of the coding process (Saldana, 2016). Each open-ended response could be assigned more than one code, resulting in different total frequency counts across the four open-ended questions. The supervisor, an experienced qualitative researcher, checked the initial codes. Bazeley (2013) points out that discussions about the coding approach and different interpretations of text segments promote the clear naming of codes. All decisions about coding and naming of categories were reached by consensus. Once an agreement was reached about code names, similar codes were grouped in an iterative process, again in discussion with the supervisor, until the final set of categories and subcategories was derived. The frequency counts of codes in the subcategories and categories were reported graphically, with the categories as legends to facilitate understanding of the subcategory counts represented by the bars in the graphs. Where relevant, the graphs include negative counts to indicate text segments coded as negative responses. In the discussion, category names start with capital letters to distinguish them from subcategories.

3.5. Phase 2: Focus Group Discussions

A focus group is one of the techniques used to gather qualitative data from participants. The researcher guides the discussion to observe the participants and explore and analyse the research topic (Acocella, 2012). In an explanatory sequential mixed-methods study, using a focus group to explain the data from the quantitative phase has many advantages and disadvantages.

Focus group discussions are advantageous because they allow for the collection of high-quality data quickly, since there are multiple participants in the group (Acocella, 2012). The group's diversity allows for a range of perspectives to be explored and allows participants to clarify ideas and contributions from other group members (Powell and Single, 1996). Rich experiential feedback may result from group interaction, which the researcher can quickly identify and collect (Powell and Single, 1996). There are, however, some disadvantages to data collection in a focus group. Some researchers believe that data collection in this manner is superficial and allows for superficial data to be collected (Powell and Single, 1996). Some participants may

feel judged when providing answers and fear not meeting the researcher's expectations (Acocella, 2012). In this study, the researcher decided to use focus groups, since they are flexible, allow for an efficient collection of diverse participant inputs, and allow participants to express diverse opinions while contributing to each other's ideas and opinions.

3.5.1. Development of the Interview Schedule

The questionnaire ended with a question asking students interested in participating in the focus groups to provide their email addresses. Twenty-seven students volunteered to participate in the focus-group discussions (FGD). These students were emailed invitations, including a participant information sheet and separate consent forms for focus-group participation and the audio-recording of the focus-group session (see Appendix B).

The analysis of the questionnaire data highlighted areas which required further exploration, specifically, participants' diverse ideas about what aspects of the online content and interactions supported their learning and which aspects they found challenging. They also mentioned specific challenges in the online questionnaire that required probing, since these areas could contribute to improving the online content for future use. The questions developed for the FGD (see Appendix C) focused on these areas and allowed participants to express and explain some of the responses from the online questionnaire.

3.5.2. Data Collection

The study's second phase, or the qualitative part, planned to enrol the first ten students who volunteered to participate in the focus-group discussions. Voluntary or self-selection sampling is a quick and effective way to get interested participants to give feedback; however, it is acknowledged that this poses self-selection bias concerns. In an attempt to address this, all participants interested in participating in the FGD were invited. In this way, it was hoped that a more diverse group would participate. However, only 5 participants participated in the focus groups despite keen interest from 27

individuals. The reasons for their failure to participate were not made explicit to the researcher; participants just failed to arrive for the scheduled groups.

Conducting the Focus Groups

I conducted two online FGD (*n* = 2; *n* = 3) using Microsoft Teams in December 2021. Two focus groups were conducted to accommodate the participants' schedules. I put the students at ease by introducing the purpose and scope of the FGD and thanking them for participatin in this research. The Microsoft Teams interviews were conducted with cameras off because of internet bandwidth constraints. During each FGD, the students were asked about the format of the material that best supported their learning experience, challenges with the learning content, their experience of the online tutorials, whether the online content and interactions prepared them to manage patients, and what they consider the students' role in the learning process.

3.5.3. Analysing the Focus Group Transcripts

The de-identified verbatim transcripts from the focus-group sessions were analysed thematically (Braun and Clarke, 2013). The transcripts were iteratively coded and re-coded with the assistance of an experienced qualitative researcher to ensure that as many feedback areas could be identified as possible. Sub-codes were generated from the transcripts' analysis, discussed, reviewed, and then grouped into codes. The codes were grouped into sub-themes and themes in an iterative process until consensus was reached about the naming and defining of the themes and sub-themes. The researcher used MAXQDA 2020 to manage the coding process. To ensure intercoder reliability, the researcher checked the coding iteratively with an experienced qualitative researcher until they agreed on the coding system.

The findings are presented as thematic maps that display the relationships between the themes and subthemes (Braun and Clarke, 2013). Frequency counts are included to show the extent of the themes and sub-themes (Fraenkel, Wallen and Hyun, 2012; Krippendorff, 2013), without implying that "numbers reveal the truth in the data" (Braun and Clarke, 2013, p. 262). Pseudonyms are used for reporting purposes (for example, participant 1 will be referred to as P1).

3.6. Positionality and Reflexivity

As the IPC coordinator, I was aware that my students might feel obliged to participate in the study but hoped that the survey timing would mitigate the power dynamic: the study began after the final-year IPC teaching was complete, thus effectively ending my relationship with the students. The insights gained from coordinating the IPC block during 2020 led me to believe that the students' perceptions and experiences of the online content and interactions were critical to contribute to the body of knowledge developing around the online platform to augment theoretical knowledge and clinical skills and the possibility of standardising learning inputs across the DCT sites.

My belief that knowledge is built on previous experiences and requires insight into students' experiences and perceptions of building and accessing knowledge may have influenced my interpretation of the data. The CoI model considers the educational experience to be influenced by not only the social presence, cognitive presence, and teaching presence but also the context, selection of the content and use of the content. Using this model as a lens, I was committed to exploring ways to improve and develop the programme.

3.7. Ethical Approval

Ethical approval for the study was granted by the University of the Witwatersrand Human Research Ethics Council (Medical), (Certificate Number M210938) (see Appendix D). Permission to conduct the study was granted by the Unit for Undergraduate Medical Education (see Appendix F).

All quantitative data collected was kept anonymous and confidential in a password secured folder. Confidentiality during the FGD could not be guaranteed, however, steps were taken to preserve anonymity by assigning the participants pseudonyms (e.g., Student 1 was referred to as S1, etc) prior to the focus-group transcript analysis and were used for reporting purposes. A password-protected key linking the student

to their pseudonym was stored on a hard drive and was only available to the researcher.

3.8. Rigour

There is no clear consensus on the definition of rigour (Gill and Gill, 2020). However, Davies and Dodd (2002, p. 280), suggest that the meaning of rigour in the research process is most closely captured by the phrase “strict enforcement of rules”. Liu (2017) describes rigour as the scrupulous and meticulous manner in which research methods are applied in the research process. In both definitions, rigour is viewed as a way to visibly order and systemise the research process (Davies and Dodd, 2002; Liu, 2017). Rigour compels the researcher to commit to structured and controlled planning of each research stage, from method selection and data collection to data analysis and interpretation to ensure the accurate depiction of the study and its findings (Liu, 2017).

There is a discussion in the literature as to which terms and criteria should be used to assess rigour in research (Winter, 2000). Guidelines exist for rigour in quantitative and qualitative research, but clear criteria for rigour in mixed-methods research has poor consensus (Brown et al., 2015). In quantitative research, criteria such as validity, reliability, replicability and generalisability are used, whereas criteria of credibility, transferability, dependability and confirmability are considered in qualitative research (Brown et al., 2015). In an explanatory sequential mixed-methods study design, the qualitative items explain and validate the quantitative findings rather than provide rigorous data (Creswell and Plano Clark, 2018). I have therefore used the criteria of generalisability, validity and reliability to discuss the rigour of this mixed-methods study.

Generalisability is considered a primary criterion for evaluating the rigour of a study (Polit and Beck, 2010). I employed Firestone’s third model of generalisability, also known as case-to-case translation (Firestone, 1993). Polit and Beck (2010) point out that Lincoln and Guba (1985) refer to generalisability as transferability. I detailed the study’s methods, context, and findings in what is known as “thick description”, which facilitates duplication or replication of the study (Morse, 2015). The reader can then

evaluate the extent to which the findings apply to their circumstances and situations (Polit and Beck, 2010).

The validity criteria in mixed-methods research are not straightforward, since, in mixed-methods research, there is no single truth from a quantitative measurement (Onwuegbuzie, Daniel and Collins, 2009). Validity is a construct based on the process and intention of a research method rather than a single, fixed or universal concept (Winter, 2000). Validity promotes the accuracy of the measurement and whether what was intended to be measured is measured (Winter, 2000). Validity may be logically based or empirical. Empirically based validity may be further divided into criterion-based and construct-related validity, while logically based validity concerns content-related validity. Content-related validity comprises face validity, item validity and sampling validity. All three types of content-related validity rely on logical analyses by expert judgement (Onwuegbuzie et al., 2009). Face validity is a construct used to evaluate how the measured items appear to the respondents (Thomas, Hathaway and Arheart, 1992; Creswell and Creswell, 2018) and how relevant, important and interesting these items are to the respondents (Onwuegbuzie et al., 2009). In this study, face validity, using expert researchers to judge the content and format of the instruments, was used to further improve the overall rigour (Creswell and Creswell, 2018).

The reliability of a study is closely related to the validity of the study. The subtle difference is that reliability is more concerned with the ability to give an exact measurement consistently (Winter, 2000) rather than evaluating the accuracy of the measurement (Winter, 2000). Reliability is equally vital to quantitative and qualitative research, since it gauges the degree to which the measurements can be replicated (Winter, 2000). Inter-coder reliability is the manner in which findings of content analysis and thematic analysis from two or more different researchers can be discussed to assess the degree of agreement between them (Braun and Clarke, 2021; Nili, et al., 2020; Nili et al., 2017). To ensure consistency of data interpretation in this study, I used inter-coder reliability measures. I submitted my content analysis and thematic analysis codes and themes to an experienced researcher to check and verify my findings' interpretation to improve the results' reliability.

The study's rigour was strengthened by using the strategy of triangulation. Triangulation was originally used in qualitative research when multiple forms of qualitative data were collected (Denzin, 1970). Today, with the more common use of mixed-methods research, triangulation has returned to favour, as Teddlie and Tashakkori noted (Denzin and Giardina, 2015). Triangulation uses two or more data sets or methods to answer the same question (Morse, 2015). Equal priority is given to the quantitative and qualitative data and analysis (Creswell, Fetters and Ivankova, 2004) and is based on the convergence of different measures of the same objective (Campbell and Fiske, 1959; Cohen, Manion and Morrison, 2018). In this way, it aims to increase the scope and depth of the study findings by offering different perspectives (Morse, 2015) to address the research question (Creswell et al., 2004).

3.9. Conclusion

This chapter described the purpose of a study paradigm and study design. I positioned myself within the pragmatic research paradigm and explained why I conducted the study using a mixed-methods design. This explanatory sequential mixed method study was explained by describing the two phases and how the data was collected and analysed in each phase. This chapter also records my positionality and efforts to improve the study's rigour and ethical considerations for the study. The next chapter will document the findings of the study. The quantitative data will be presented first; then the qualitative data will be described and discussed.

CHAPTER 4. RESULTS

4.1. Introduction

In this chapter, the findings of the study are presented. In keeping with the recommendations for reporting mixed-methods research, the statistical and content analysis of the data from the survey are reported first, separately and merged (Creswell and Creswell, 2018), followed by the findings from the thematic analysis integrated with relevant findings from the content analysis.

4.2. Phase 1: Survey

4.2.1. Response Rate

The survey response rate was 52% (164/316). Response rates for online questionnaires are often low, ranging between 21% and 30% (Sax et al., 2003). We were thus satisfied with a response rate of 52%, which approximated the estimated required rate of 54%.

4.2.2. Respondent Demographics

Most of the respondents were Black (36.8%), female (66.5%), and 21–25 years old (65.2%) (see Table 1). The respondents (66.5% female and 33.5% male) closely represented the general population (60.4% female and 39.6% male). There was no significant difference (NSD) between the characteristics of the respondents and those of the cohort from which they were sampled (see Table 1).

4.2.3. Frequency and Nature of Usage

This section reports on how often respondents accessed the online content, what material they accessed and why they accessed specific types of content and interactions.

Table 1. Respondent demographics

Characteristic	Respondents *n* = 164 (n; %)	GEMP IV cohort N = 316 (N; %)	*p*-value
Gender			
Male	54 (33.5)	124 (39.24)	0.197
Female	107 (66.5)	191 (60.4)	0.197
Other	3 (1.83)	1 (0.32)	
Total	164	316	
Age (years)			
21–25	107 (65.2)	222 (70.3)	0.299
≥ 26	57 (34.8)	94 (29.7)	0.299
Total	164	316	
Population group*			
Black	60 (36.8)	126 (39.9)	0.410
White	59 (36.2)	102 (32.3)	0.353
Indian	26 (16.0)	67 (21.2)	0.199
Other	18 (11.0)	21 (6.6)	0.084
No response	1		
Total	164	316	

*These racial classifications were introduced during the apartheid era (1947–1994) according to the South African Population Registration Act (No. 30 of 1950). The terms for the different population groups, as defined by the apartheid system, are still used to assist the South African government in redressing previously disadvantaged population groups. Race was included for demographic purposes only and was not included in the analysis.

Most respondents (93.3%) agreed they could easily access the online-learning material. 'Ease of accessibility' showed NSD by gender ($p = 0.341$) and age ($p = 0.418$) (see Appendix E for all statistical analyses). More than 70% of respondents indicated that they accessed the online learning material several times a week, with NSD by gender ($p = 0.892$) and age ($p = 0.06$). Eighty-six percent agreed that they mainly accessed the online content to identify what they needed to learn, with NSD by gender ($p = 0.338$) and age ($p = 0.208$), while 74.2% accessed the online content to identify learning areas they needed to improve, with NSD by gender ($p = 0.141$) and age ($p = 0.593$).

Less than half (43.8%) of respondents agreed they had accessed online learning mainly to attend the synchronous tutorials, with NSD by gender ($p = 0.323$) and age ($p = 0.055$). More than 80% indicated that they could access support when needed, with NSD by gender ($p = 0.295$) and age ($p = 0.482$).

4.2.4. Relevance and Application of the Online Content and Interactions

The second section of the online questionnaire explored the respondents' experiences and perceptions of the relevance and application of the online content and interactions. This section focused on whether the tutorials covered in the online content and interactions were relevant to the patients the respondents were seeing and if the online content and interactions assisted in directing[2] their learning and prepared them to manage the patients.

More than 80% of the respondents agreed that the online content was logically organised, with NSD by gender (p = 0.295) and age (p = 0.418); see Appendix E for statistical analyses; and that its structure and interactions helped direct their learning, with NSD by gender (p = 0.541) and age (p = 0.945). Figure 4.1 shows the content analysis of the follow-up question, which asked students why they agreed or disagreed that the structure of the learning materials directed their learning. The positive responses are depicted as positive counts, and the reasons respondents perceived the online content and interactions as *not* directing learning are depicted as negative numbers.

The three categories of reasons why respondents felt the online content and interactions directed or did not direct their learning (Figure 4.1 on p. 40) related to the 'Selection of content', 'Usefulness of the content' and 'Organisation of content'. The primary reasons why the 'Selection of content' (n = 102/174) promoted learning was because the 'content focused learning' (n = 37/102) and the 'content highlighted core knowledge' (n = 35/102). However, some respondents felt the 'content was not comprehensive' (n = -10/102).

The main reasons why the content was regarded as applicable ('Usefulness of the content'; n = 38/174) (see Figure 4.1) were that the 'objectives were clear' (n = 5/38) and that 'content promoted further reading' (n = 4/38). Some participants, however,

[2] The word 'directed' was used deliberately because students were more likely to understand what it meant. The purpose was not to ask students whether they had self-directed their learning.

thought the content did not help them prepare for assessments (*n* = -11/38). The final category of reasons why respondents felt that the online content and interactions supported the learning was ‘Organisation of content’ (*n* = 24/174). They cited reasons such as the ‘content was well structured’ (*n* = 14/24), and the ‘content provided a framework for learning’ (*n* = 3/24). However, some respondents felt the OLM ‘needed content headings’ (*n* = -4/24).

Sixty-four percent of respondents felt the online content was relevant to managing patients in clinical settings, with NSD by gender (*p* = 0.059) and age (*p* = 0.373). Figure 4.2 (on p. 41) shows why students agreed or disagreed that the online content and interactions were relevant to helping them manage patients. The most common perception was that the online content and interactions ‘Facilitated patient management’ (*n* = 105/179) because the ‘resources provided were helpful’ (*n* = 45/105), there was ‘adequate information to manage patients’ (*n* = 15/105) and ‘practical treatment outlines’ (*n* = 10/105) were provided. The remaining two categories represented negative responses and those who had provided ‘Irrelevant responses’ (*n* = 7) that did not answer the survey question. Respondents who felt that the online content ‘Limited patient management’ (*n* = -67/179) did so because the ‘content was not comprehensive’ (*n* = -35/67) and regarded ‘clinical practice better for managing patients’ (*n* = -12/67). Other reasons why students felt the online content and interactions did not support their ability to manage patients were ‘insufficient guidance on management’ (*n* = -8/67) and ‘site differences limited application’ (*n* = -7/67).

Most respondents (84%) felt that the topics covered by the tutorials were relevant, with NSD by gender (*p* = 0.681) and age (*p* =0.150). Almost two-thirds (62.0%) agreed that they found the online materials helpful when preparing for assessments, with NSD by gender (*p* = 0.982) and age (*p* = 0.209).

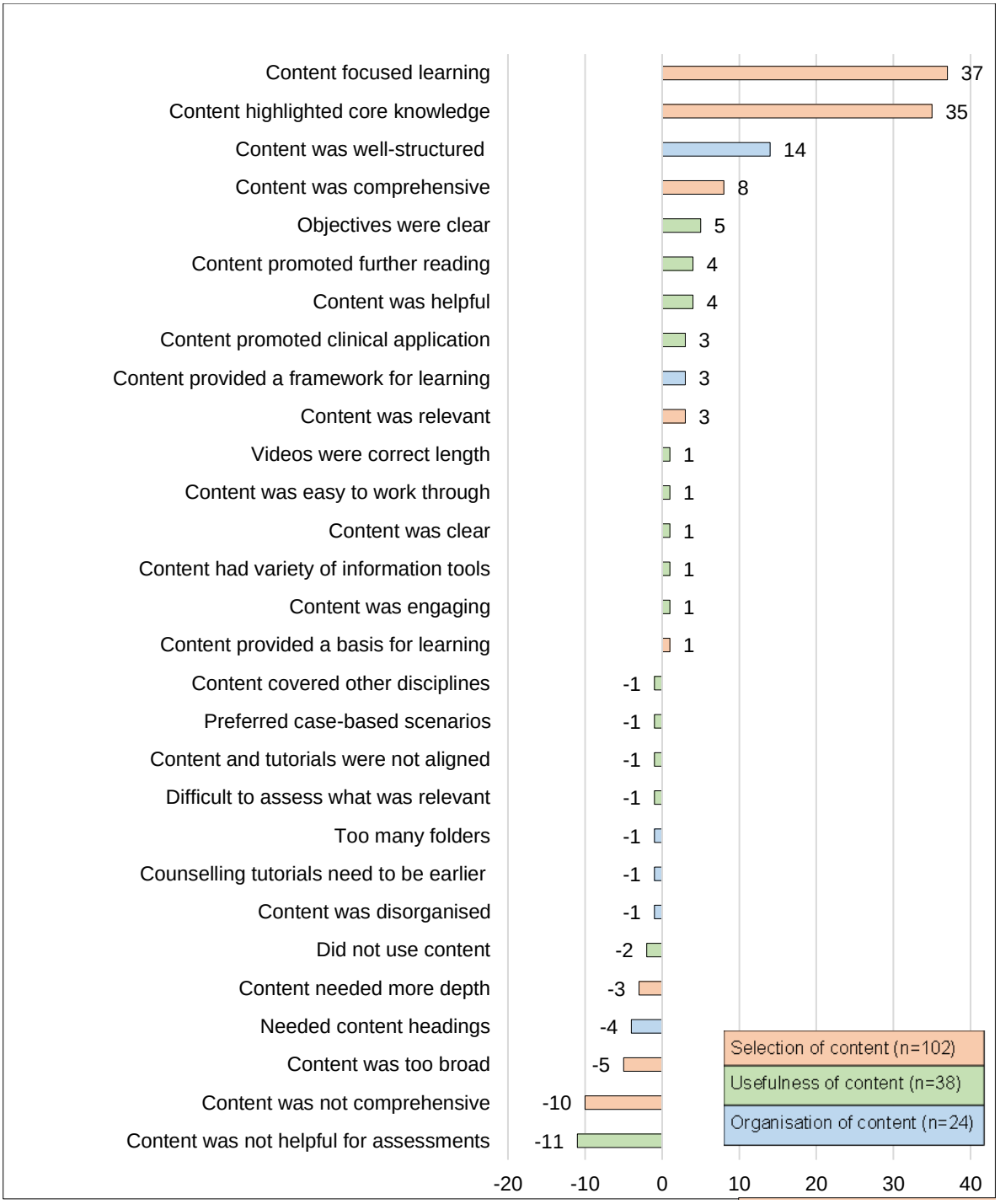

Figure 4.1 Counts of perceptions that the online materials directed learning (*n* = 174). Negative counts represent negative responses.

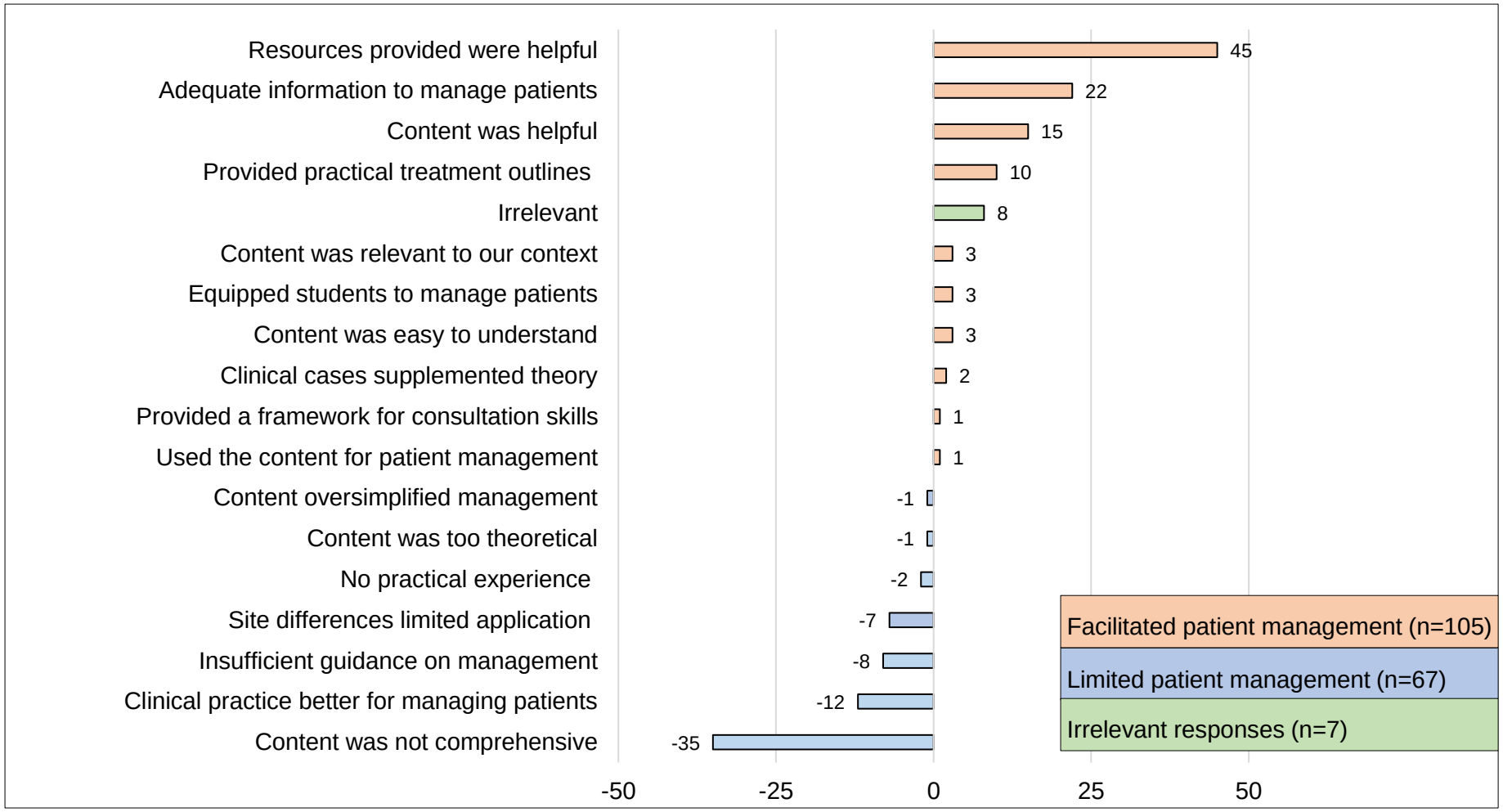

Figure 4.2 Reasons why the online-learning content influenced patient management (*n* = 179). Negative counts represent negative responses.

4.2.5. Augmentation of Clinical Skills and Patient Management

The third section of the online questionnaire asked respondents whether the online content and interactions augmented their clinical skills. They were asked if the online content introduced them to new skills and improved their competency. They were also asked to consider if the online content had assisted in developing their problem-solving skills and motivated them to practice their skills in the clinical setting.

The medical education literature highlights that critical thinking skills are essential for problem-solving (Maudsley and Strivens, 2000). More than twice as many females (65; 39.6%) than males (26; 15.9%) agreed that the online content assisted them with developing problem-solving skills and this difference was statistically significant (p = 0.035) (see Appendix E). There was NSD in developing problem-solving skills by age (p = 0.528). Gender also significantly affected clinical skills competence (p = 0.007) but not age (p = 0.853). Most female respondents (65.26%) agreed that the online content improved their clinical skills competence, compared to 9.8% of the males.

The skills videos and differential diagnosis construction tasks motivated 63.4% of respondents to practice their clinical skills, with NSD by gender (p = 0.857) and age (p = 0.041). However, more than a third (40.9%) of respondents remained neutral when asked if the online content introduced them to new clinical skills, with 26.3% agreeing and 32.9% disagreeing with the statement, with NSD by gender (p = 0.281) and age (p = 0.186).

4.2.6. Preferred Learning Methods

Figure 4.3 (on p. 43) shows the learning methods respondents would prefer in the future. The majority (85.4%) requested more quizzes and tests, 75.6% more printable resources, 64.4% more recorded PowerPoint presentations, and approximately 40% wanted more recordings of synchronous tutorials that they could watch at their convenience. Only 25.9% wanted more synchronous tutorials, while 40% did not.

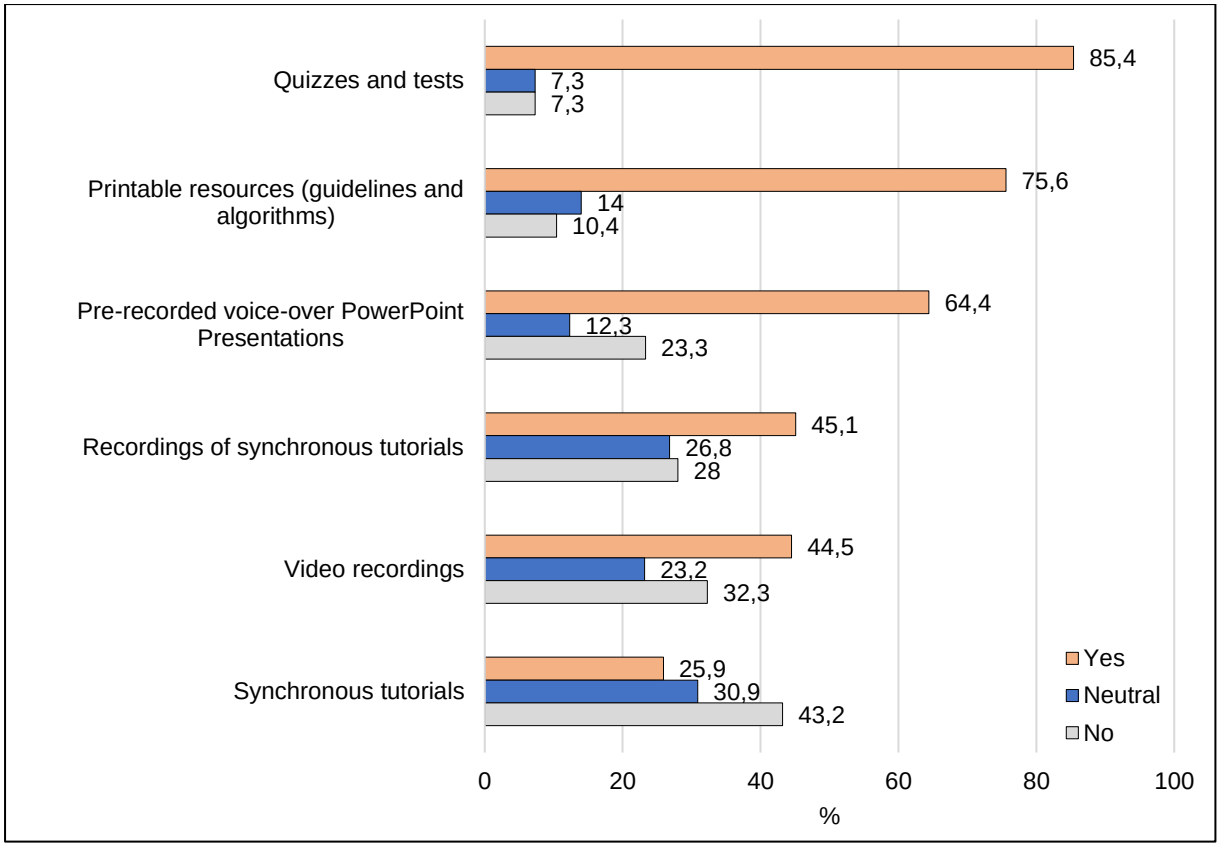

Figure 4.3 Preferred learning methods

4.2.7. Features of the Online-Learning Content that Supported Learning

The 'Range of activities' provided was the main feature supporting respondents' learning experiences (*n* = 73/148) (see Figure 4.4). Their preference for 'asynchronous activities' (*n* = 53/73) over 'synchronous activities' (*n* = 20/73) correlates with the preferred learning methods reported in the previous section (see Figure 4.3): asynchronous tests and quizzes, printable resources and pre-recorded VoPPs were preferred over synchronous tutorials. 'Content selection' (*n* = 56/148) was another feature that supported learning (see Figure 4.4), specifically the 'provision of additional resources' (*n* = 23/56) and 'provision of common presenting conditions' (*n* = 8/56). The categories of 'Flexible access to content' (*n* = 8/148) and 'Organisation of content' (*n* = 4/148) were noted as less important features supporting student learning (see Figure. 4.4).

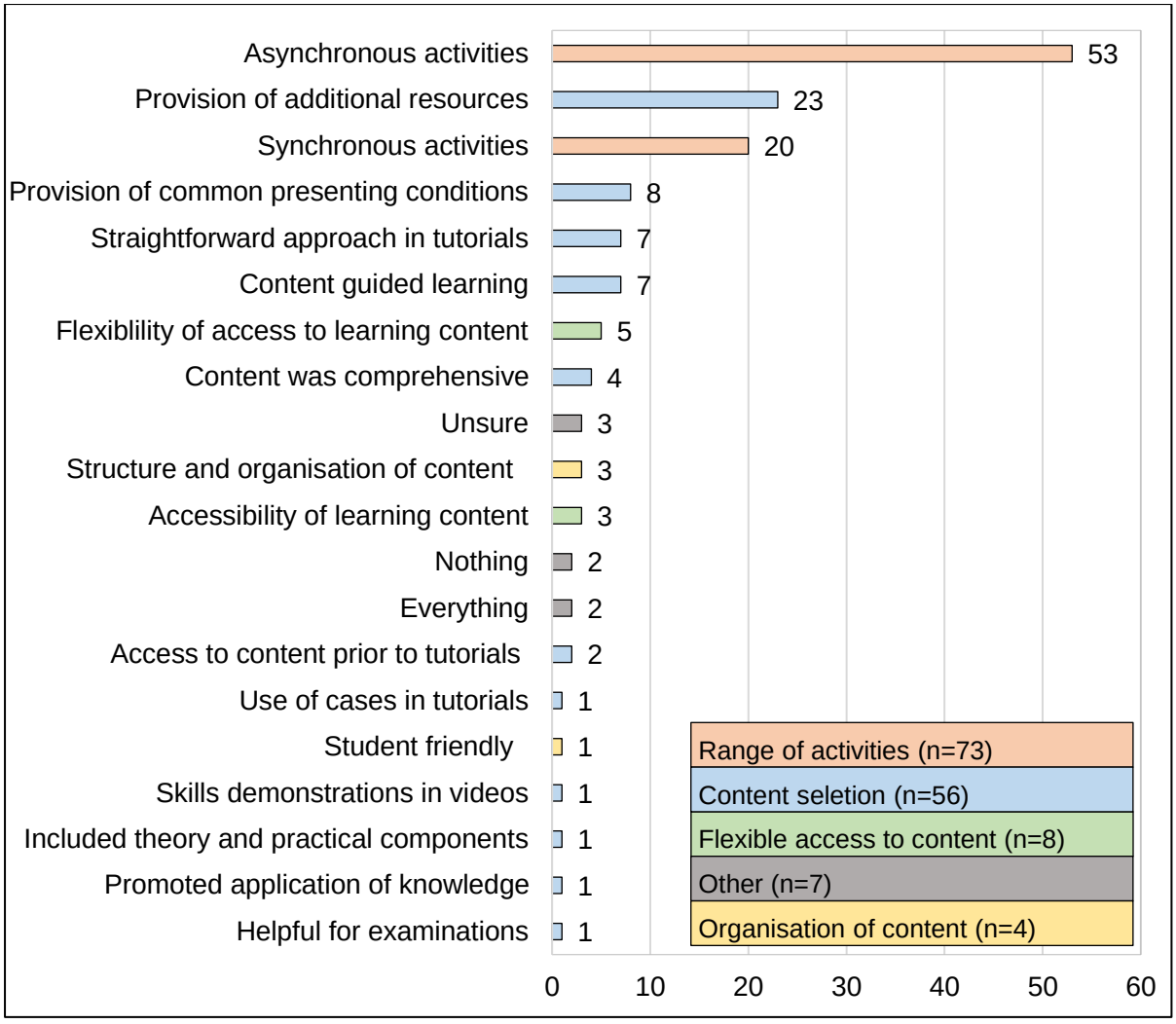

Figure 4.4 Features of the online-learning content that best-supported learning (*n* = 148)

4.2.8. Challenges of Learning Online

The primary category of online-learning challenges was 'Pedagogical issues' (*n* = 30/130) (see Figure 4.5 on p. 45). The main issues were that the 'content was not comprehensive' (*n* = 25/30) and a 'lack of alignment' (*n* = 5/30). The second largest category was the 'Excessive workload' (*n* = 27/130). This category included 'too much content for time available' (*n* = 12/27), 'tutorials were too long' (*n* = 4/27), 'videos were too long' (*n* = 3/27) and 'too many synchronous tutorials' (*n* = 2/27). 'Operational issues' (*n* = 20/130) also made learning difficult: 'tutorials conducted at inconvenient times' (*n* = 9/120), 'topics not named' (*n* = 8/20) and 'some PowerPoints (sic) were not narrated' (*n* = 2/20).

Another notable category of challenges to online learning was 'Learning issues' (*n* = 17/130) (see Figure 4.5). The primary learning issues were 'difficulties with online learning' (*n* = 7/17), 'difficulty learning communication skills online' (*n* = 5/17), 'specific learning issues' (*n* = 4/17) and the 'challenge of learning clinical skills online' (*n* = 1/17).

The most significant contributor to the 'Technical issues' category (*n* = 11/130) was 'difficulties connecting to the internet' (*n* = 7/11). Sub-categories such as 'difficulties accessing quizzes' (*n* = 2/11), 'could not access the videos' (*n* = 1/11) and 'difficulties with the learning management system' (*n* = 1/11) were less problematic (see Figure 4.5).

'Course expectations were unclear' (*n* = 5/130) was the final category contributing to the challenges of online learning. Respondents were unclear about the depth of knowledge required in the content.

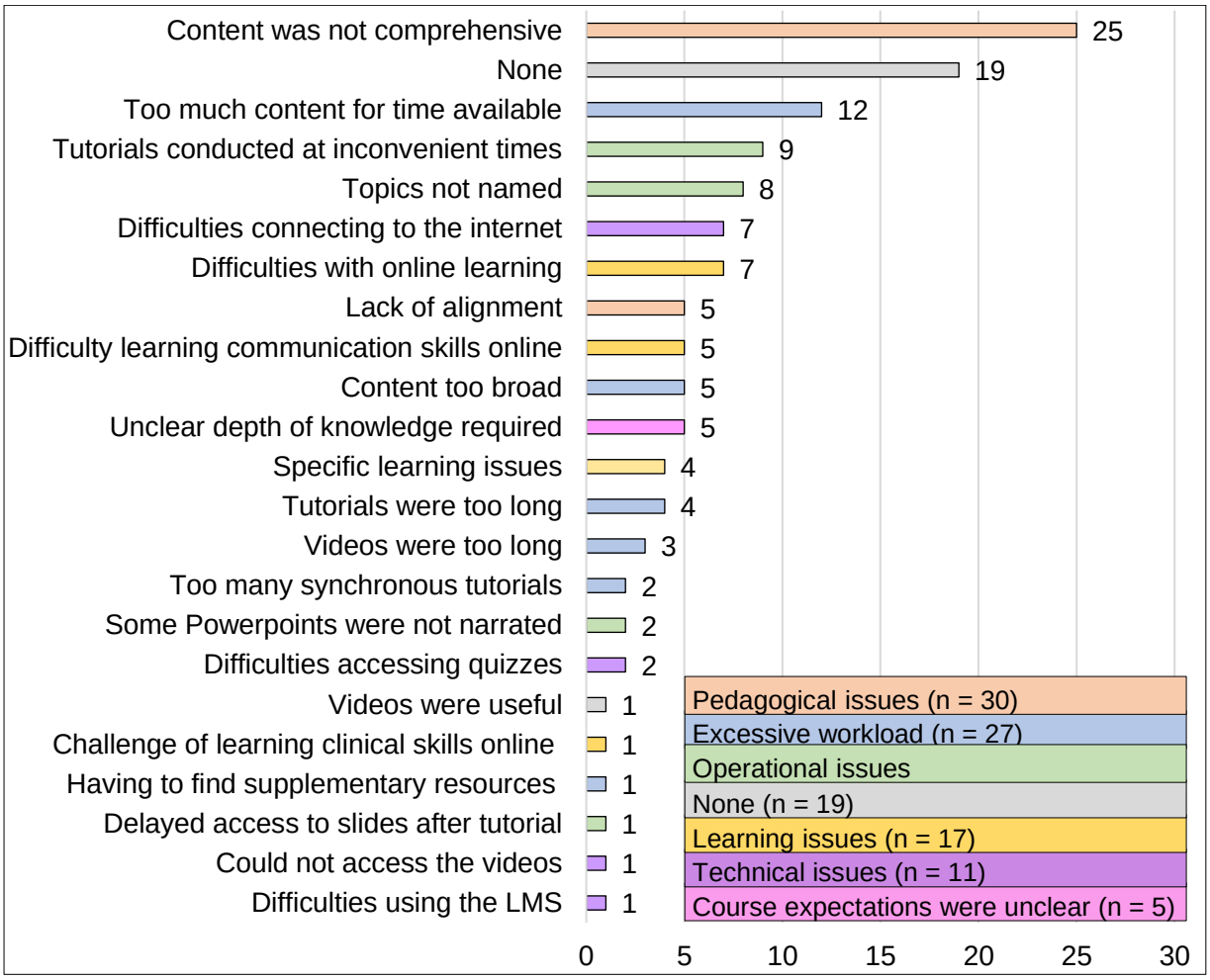

Figure 4.5 Counts of challenges with online learning (*n* = 130)

4.3. Phase 2: Thematic Analysis of Focus-Group Transcripts

Three themes were identified from the thematic analysis of the FGD: 'Features supporting learning', 'Challenges of learning online', and 'Ways to improve learning'.

4.3.1. Features Supporting Learning

The 'range of online activities' (*n* = 24), previously identified from the content analysis as a feature supporting learning (see Figure 4.4 on p. 44), was the principal feature supporting learning in the thematic analysis (see Figure 4.6 on p. 48). The FGD participants said that the online tutorials (*n* = 12; see Figure 4.6) offered appropriate content despite concerns identified in the content analysis (see Figure 4.5 on p. 45) that the tutorials contributed to an excessive workload.

The provision of 'treatment guidelines' (*n* = 5) was the second major feature supporting learning, as illustrated in the following comment: "Yes, it did contribute towards management. The reference to guidelines, I think, directly impacted my management of the patient, [and] the online content did support my understanding and the identification (of the management plan)" (P2, FG1).

The second group of features supporting learning identified in the TA included the 'structure of the online content' (*n* = 23; see Figure 4.6). The 'selection of content' (*n* = 21) promoted the application of theoretical knowledge (*n* = 8) and was relevant to the PHC context (*n* = 6), as evident in the comment below:

> *… the content, I did find it useful. I found it more useful, actually, for the clinical part of the block, the actual being on the ground, seeing patients and because it did cover the conditions that we were seeing and the type of patients we were seeing. (P4, FG2).*

The 'online content also provided a sound foundation for learning' (*n* = 7, see Figure 4.6), as pointed out by the following FGD participant:

> *I used additional content to study for it, and one of my mates (laughs)…he only used the online content and mainly focused on that and did a bit of reading around the, specifically, the online content. And ja, he actually did better than me. So, I think the online content is good. I think it's sufficient. (P2, FG1)*

This quote highlights how students' perceptions of the purpose of the online content may differ from that of educators. Students' perception of the value of the online content and interactions may be based on whether it improves their examination scores.

The 'organisation of the content' (*n* = 2, see Figure 4.6 on p. 48) was considered another feature supporting learning. In the FGD, one of the participants said: "The online content was really helpful. Just like P3, I like how everything was broken up into those folders, which also helps to direct the studying" (P5, FG2).

The TA findings support the results that most respondents agreed that the online content was logically organised and appropriately structured and that the selection and organisation of the content supported learning.

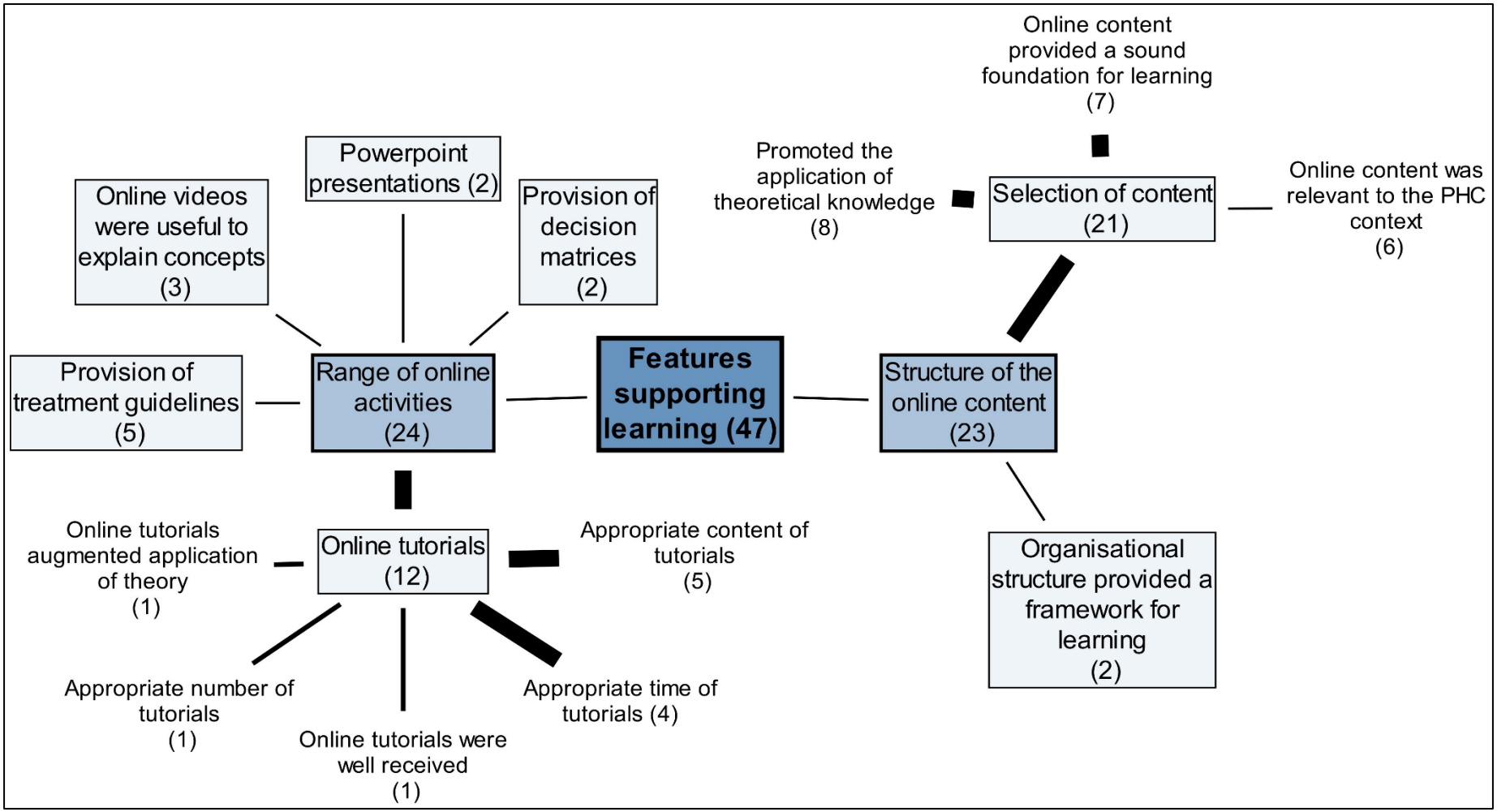

Figure 4.6 Thematic map of features that supported learning. Counts represent the frequency of codes in the coding hierarchy.

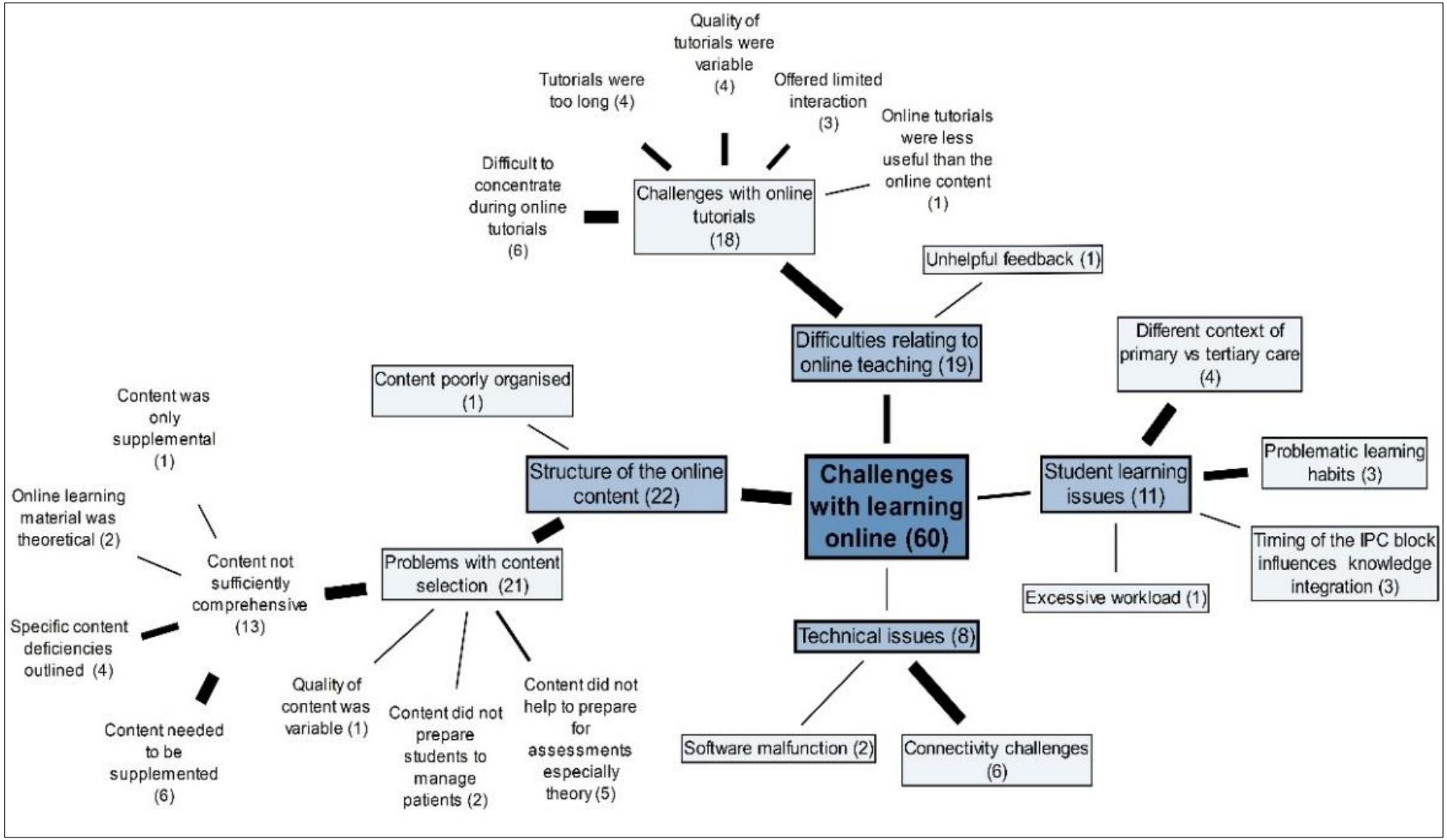

Figure 4.7 Thematic map showing the challenges with learning online. Counts represent the frequency of codes in the coding hierarchy.

4.3.2. Challenges with Learning Online

The major challenge with learning online (see Figure 4.7 on the previous page) was the 'structure of the online content' (*n* = 22), with a focus on 'problems with content selection' (*n* = 21). The FGD participants felt that 'the content was not sufficiently comprehensive' (*n* = 13). These opinions corroborate the content analysis findings that the content was not comprehensive, as shown in Figure 4.2 (on p. 41) and Figure 4.5 (on p. 45). Other challenges about the 'content did not prepare students to manage patients' (*n* = 2), and the 'quality of content was variable' (*n* = 1) corroborate the content analysis in Figure 4.2 and Figure 4.5. The quote below illustrates the impact of all PowerPoint presentations not having narration:

> *… sometimes you'd have a nice video, and other times it was literally just a 10-slide PowerPoint [presentation] that you'd go through on your own that just had text, which is basically like you just work through it in 15 minutes, and then what [do] you get out of it, you know? (P3, FG2)*

Two other sub-themes emerged as challenging to learning online. The sub-theme 'difficulties relating to online teaching' (*n* = 19) highlighted the 'challenges with online tutorials' (*n* = 18). One participant had this to say about the online tutorials:

> *I do think, though, that it's very inconsistent in terms of who is giving the talk. Sometimes you have a registrar who has been asked to do it by their consultants, and they're just not keen at all…which does impact on your learning. (P3, F2).*

Another sub-theme related to the 'challenges of learning online' (*n* = 60) was 'student learning issues' (*n* = 11). The 'different context of primary vs tertiary care' (*n* = 4) and the 'timing of the IPC block influences knowledge integration' (*n* = 3) were additional challenges to those discussed in the content analysis on 'learning issues' earlier in this report (see Figure 4.5). One of the FGD participants had this to say about the timing of the IPC block:

We still have a lot of growing to do. It's unbelievable how much growth we go through on a year-to-year basis. And so, if we haven't got the benefits of those rotations under our belt, sometimes it can be a little bit difficult to know what…you know, what the objectives are, or what's helpful to know. (P3, FG2).

The final sub-theme that posed challenges to participants learning online was 'Technical issues' (see Figure 4.7 on p. 49). 'Connectivity challenges' were the main contributor supporting the content analysis findings in Figure 4.5 (on p. 45), indicating that 'difficulties connecting to the internet' were problematic for students.

4.3.3. Ways to Improve Learning

The final theme, 'Ways to improve learning' (*n* = 18; see Figure 4.8, on p. 53), comprised 'improvements to the online content structure' (*n* = 13) and 'general recommendations' (*n* = 5). The need to 'add more content' was the primary way to improve online content. This view was also found in the content analysis when respondents felt that the 'content was not comprehensive' and indicated the need for 'having to find supplementary resources' (see Figure 4.5 on p. 45) and as noted in Figure 4.2 (on p. 41) that the 'content was not comprehensive', limiting students' ability to manage patients, and that 'insufficient guidance on management' had been provided (see Figure 4.2). An FGD participant emphasised this as follows:

"It might be helpful to just supplement the online content a little bit more for those blocks that haven't been…that students might not have covered yet, so that they just have more to…you know, like because they don't have that information…that knowledge yet." (P4, F2).

Finally, the FGD participants suggested 'recommendations for instructors' (*n* = 3) and 'recommendations for students' (*n* = 2), which they felt would help improve online learning. One participant suggested this to instructors: "We would really benefit from more shadowing of a doctor and working with the doctor in tandem and managing

patients together. Being a team.” (P3, F2). One participant offered the following advice to students:

> *“What I did is I made a little list for myself in the back of my logbook or on the back of my book of things that I saw that you know of, but you sort of forget, and go through that.” (P1, F1).*

4.4. Conclusion

This chapter described this study's quantitative and qualitative findings using graphs and thematic maps to illustrate the results. The next chapter interprets this data in a discussion that considers the students’ experiences and perceptions of IPC learning at DCT sites during the Covid-19 pandemic and highlights several areas of interest for future IPC learning.

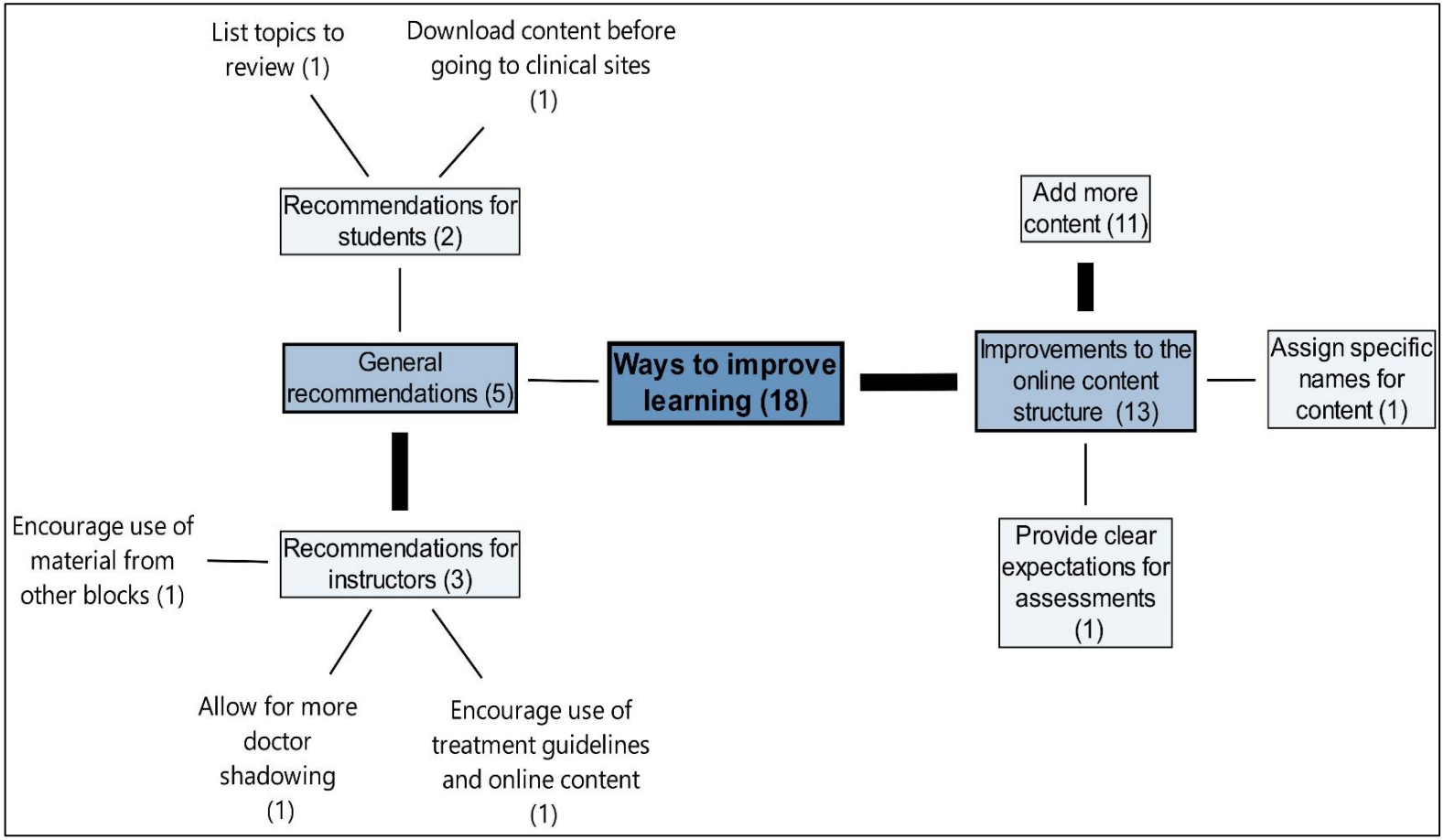

Figure 4.8 Thematic map showing the ways to improve learning. Counts represent the frequency of codes in the coding hierarchy.

CHAPTER 5. DISCUSSION

5.1. Introduction

In this chapter, I interpret the respondents' experiences and perceptions of IPC online learning during the Covid-19 pandemic using the lens of the TAM, CoI model and the meta-theory of SRL. The chapter is structured according to the study objectives, which are restated here for the benefit of the reader:

1. To explore the frequency and nature of students' usage of the OLM.
2. To explore to what extent the OLM augmented students' theoretical learning.
3. To explore to what extent the OLM augmented students' clinical skills.
4. To explore students' perceptions of how the OLM could be improved to better support learning.

One of the factors motivating this study was to reflect on my competencies as a clinical educator teaching online for the first time, as stated in my personal statement (p. xiv). When discussing each of the study objectives, I have thus included my reflections structured as a reflective conversation (Schön, 1983; Schon, 1987). Finally, I discuss how this study's findings can be used to explore related areas in medical education.

5.2. Frequency and Nature of the Usage of the Online-Learning Materials

Technological stability and student readiness, fundamental to online learning, require hardware, software, internet connectivity, and data (Mosa, Naz'ri bin Mahrin and Ibrrahim, 2016). A previous study conducted at Wits University by Ingratta et al. (2022) raised concerns about student access to devices and their readiness to use them. However, while the respondents in this study highlighted technical issues, such as internet connectivity and software issues, as some of their learning challenges, they did not report problems with access to devices or their readiness to use devices and experienced few software issues with using the LMS and accessing online materials.

One reason for the differences between the findings of the pre-Covid-19 Ingratta study and this one may be the university's response to ensuring that students had access to devices and the student and faculty training provided to promote the readiness to use the LMS. The transition from the Sakai LMS to *ulwazi,* besides the additional work it meant for teachers to transfer their online materials to the new LMS, and the initial adjustment required by staff and students, may also have contributed to the content being readily accessible.

The finding that the content was easily accessible contrasts with the historical difficulties with internet access experienced in low- and middle-income countries, partly due to the inequitable distribution of digital resources (Barteit et al., 2019). The content's accessibility may have influenced students' perception of the content as helpful and their reports of accessing the online content several times a week. The respondents also reported using a wide range of learning formats on the online platform, which were combined with traditional teaching and learning interactions. The integrated use of the online content with more traditional forms of teaching in the clinical space has been noted by numerous authors to have a positive effect on teaching and learning in medical education, by providing flexibility, ease of distribution, relief of staff teaching burden and standardisation of content (Cook, 2007; Cook et al., 2008; Dhir et al., 2017; O'Doherty et al., 2018; Ruiz et al., 2006). The findings regarding use and accessibility allayed my concerns about respondents' acceptance of the online content.

The rapid shift to ERL did not allow teachers time to explore students' willingness or readiness to accept and adopt online learning. Fortunately, the respondents displayed a positive attitude to online learning, similar to the findings in a pre-Covid-19 survey of medical students' readiness for increased online learning at our institution (Ingratta et al., 2022). Positive attitudes to online learning have also been reported in several studies since the onset of the Covid-19 pandemic, for example, among pharmacy students in the study by Shawaqfeh et al*.* (2020) and dental students in the studies by Schlenz et al*.* (2020) and Tshite and George (2022). A possible reason for respondents' willingness to adopt and accept online learning under ERL conditions could be the deliberate teacher, social and cognitive presence from the CoI model,

which had been built into the IPC online content. Respondents' ability to access support for their learning when needed confirmed the intentional teacher presence. Respondents' positive attitude suggests a willingness to adopt the online content and interactions as additional resources to supplement and augment learning during the Covid-19 pandemic.

5.3. Augmentation of Knowledge and Skills

Respondents agreed that the online content and interactions enhanced their theoretical knowledge and clinical skills. They felt that the content selection and organisation, including clear learning objectives, helped structure and focus their learning. The value of appropriate content selection and organisation with explicit learning objectives is underpinned by the teacher and cognitive presence of the CoI model (Shea, Richardson and Swan, 2022). Webb et al. (2013) acknowledged that providing clear learning objectives is essential for explicit course expectations, regarding these as more important than content organisation. Although some respondents in this study also regarded content organisation as less necessary for their learning, others wanted the content to be better structured by including headings and naming topics; the teacher presence of the CoI model was perhaps inconsistent and can be improved. I reflect that I need to pay more attention to planning the design of the online content and interactions, perhaps with the assistance of an instructional designer.

Some respondents found the online content not sufficiently comprehensive and felt it did not prepare them for assessments. The idea of being inadequately prepared for assessments because of insufficiently comprehensive content raises questions about whether we are training students to be successful test-takers or competent doctors. Assessment influences student learning, and perhaps educators need to rethink what and how we want to guide student learning to enrich and guide their learning experience (Schuwirth and Van der Vleuten, 2004). Rethinking assessments using SRL and the social presence of the CoI model may be one way to deepen the learning process and encourage lifelong learning.

Respondents felt educators could have enhanced their learning by encouraging them to use the guidelines and online content. The perceived lack of emphasis on the importance of using guidelines and the online content was considered a deficit by respondents, possibly because it required them to reflect on areas in which *they* needed to supplement their learning based on their knowledge and performance. The intention of providing online content with clear learning objectives was to promote student autonomy and self-regulation and reflection underpinned by SRL. Autonomy and self-regulation were demonstrated, in part, by the frequency with which respondents accessed and used the online content to identify the content they needed to learn and to identify learning areas they needed to improve, as discussed in the previous section. The uncertainty surrounding the duration of the ERL-mandated selection of specific core content to structure and guide learning and provide opportunities to allow student autonomy and self-regulation – the idea was that providing core content would stimulate further reading. While I incorporated elements of the CoI model in the IPC content, online learning is not inherently constructivist; perhaps I need to interrogate whether there were sufficient opportunities for constructivist learning and whether I needed to be more explicit about the SRL expected of students. Durning et al. (2011) suggested structuring learning to promote SRL through forethought, performance and self-reflection.

The discrepancy between some respondents finding the content comprehensive but wanting more resources and others wanting more of both, especially given that excessive workload was identified as the main challenge with learning online, was an interesting finding. A possible reason for this could be the broadness of family medicine as a discipline (Coutinho et al., 2015), which warrants further reading on diverse subject topics. Respondents reported difficulties with time management and a lack of self-discipline, which may have compounded the excessive workload. The SRL process (forethought, performance and self-reflection) (Durning et al., 2011) could improve the structuring of learning and assist struggling and remediating students.

Critical thinking skills are essential for problem-solving (Maudsley and Strivens, 2000) and clinical practice and skills. Although two-thirds of respondents agreed that the resources provided were adequate and relevant to helping them manage patients,

some felt that patient management remains best learned in the clinical setting. There is a widely held sentiment that clinical practice and student exposure to a hospital ward or outpatient department in a clinic offers a rich learning environment that promotes competence in clinical skills and management protocols (Ledingham and Harden, 1998). However, these environments provide opportunistic learning opportunities that vary across clinical settings (Ledingham and Harden, 1998). One of the ways to try to standardise experiences in clinical settings is to provide students with practical treatment guidelines on the LMS. The provision of standardised resources and treatment outlines has been noted to assist with standardising students' knowledge (Ruiz et al., 2006; Zehry, Halder and Theodosiou, 2011) and may augment competence development in clinical skills (Lala et al., 2021). The provision of online guidelines and treatment protocols is coupled with the teacher and cognitive presence of the CoI model in that the teacher provides the content, and the student is required to engage with and use the content to standardise their knowledge.

Respondents were explicit about which formats they preferred to support their learning and requested more quizzes and tests. Such activities probably allowed them to apply what they learned to the clinical setting and helped prepare them for assessments (Schellekens et al., 2021). Respondents also valued the flexible access of asynchronous interactions more than synchronous sessions. The flexibility of asynchronicity is widely accepted as one of the major benefits of online learning (MacNeill et al., 2023; Naciri et al., 2021). In contrast, prolonged or frequent synchronous teaching sessions may contribute to non-verbal overload and videoconference fatigue, also referred to as 'Zoom fatigue' concerning the Zoom software programme (Bailenson, 2021; Bennett et al., 2021). Teachers need to heed students' preferences for learning formats and be aware of the affordances and constraints of the learning formats they select to use. Respondents' request for more interactive activities indicates a desire to participate and actively engage with learning content in a meaningful manner for the intentional purpose of constructing knowledge (Jonassen, 2008), suggesting that more constructivist learning interactions are needed. Student participation is an essential component underpinning both SRL and the social and cognitive presences of the CoI model.

Respondents did not rate videos and recordings as highly as tests and quizzes. However, clinical skills videos are used by some disciplines very successfully in addition to bedside teaching (George et al., 2019; Hibbert et al., 2013). Effective clinical skills videos may augment clinical teaching without impacting an already under-resourced academic context by providing another tool to reinforce the teacher and cognitive presence of the CoI model online. However, the move to ERL and the lack of time for adequate teacher training may have resulted in several teachers converting live lectures to video format, often narrated PowerPoint recordings, without considering whether video was the most suitable format. Thomson, Bridgstock and Willems (2014) regard 'talking head' video lectures (teacher's image on PowerPoint slides) as a poor example of video usage. Video usage should be reserved for the visual advantages the medium offers rather than for content delivery, which requires teachers to be aware of the affordances and constraints of including videos in their teaching.

5.4. Improvements to Better Support Learning

Feedback from respondents and participants in the questionnaire and FGD, respectively, concerning the frequency and nature of the use of the online content and the effectiveness of the online content to augment theoretical and clinical knowledge provided insights into improving the IPC online content to support learning better.

Participants in the FGD agreed with questionnaire respondents about improving the content structure by adding headings or topic names to the online content, adding supplementary resources, and providing clear assessment expectations. The FGD participants' recommendations to educators centred mostly around content selection and organisation, which highlighted a need for a stronger and more focused and deliberately designed teacher presence to ensure the quality and consistency of the online content. These recommendations suggest that clinical educators may need more professional development in designing more effective online interactions. More doctor shadowing was suggested to improve learning, but educators can only encourage students to practice their clinical skills and role-model professional behaviour. Successful doctor shadowing has been noted as a valuable tool (Cave et

al., 2009) but requires active and supported student participation (Graham, Tso and Wood, 2011) in the clinical setting. Active student participation could be encouraged by enhancing the social presence of the CoI model and promoting SRL by designing appropriate learning interactions.

The focus-group participants recommended that students prepare learning content before the start of the block to make the block more manageable. Preparing prior to the block would have no impact on time during the previous block, since preparing learning content entails organisational preparation rather than actual learning. The learning content is available to students from the beginning of their final year and would not impact on the coordinator's workload. Preparation aligns with the idea of forethought in that preparation allows students to at least start to ascertain what knowledge and skills are needed to complete the IPC block successfully. Another suggestion focused on more student participation in clinical teams, which teachers could encourage by implementing more collaboration and sharing of clinical experiences via a more robust social presence in the online-learning space.

5.5. Recommendations from the Study

My reflection on ways to improve and support online content and interactions during the IPC block highlights three areas that could serve as recommendations to improve not only IPC teaching but clinical teaching more broadly:

1. Health professions educators must be upskilled regarding effective blended and online teaching and learning pedagogies. The CoI model is an effective, efficient and authentic way to improve online learning (Zhang, 2020). Ensuring a well-structured and organised online-learning platform with strong teacher, cognitive and social presences will assist with the development of a robust blended-learning approach. Including the three presences in online learning highlights that worthwhile learning occurs in a community comprising the teacher and students as key participants (Garrison et al., 1999). In addition, exploring the implementation of SRL in blended and online learning with realistic expectations and goals, a grasp of the process during learning and self-reflection on the

performance of the task once completed (Moos and Ringdal, 2012) is another method that can be used to encourage learner participation in their own learning.

2. Health professions educators require competencies in available digital tools and technologies. George and Sanders (2017) note that teachers lack the knowledge of how to use technology effectively in teaching and learning. They suggest that technology does not change learning but how it occurs (George and Sanders, 2017). Training health professions educators to develop digital skills and use appropriate technology to teach online will ensure a better offering for our students. Digital competency, however, must be integrated with content and pedagogical competencies for effective online teaching and learning.

3. Finally, developing basic instructional design skills in health professions educators may assist teachers in incorporating more digital tools to enhance student engagement and learning. Where teachers lack these skills or require support because of other factors, for example, workload issues, they should have the support of instructional designers to ensure the design of meaningful learning interactions.

Addressing these inadequacies requires professional and faculty development and institutional commitment to ensuring continued development in innovative medical education practices.

5.6. Limitations of the Study

This study is limited by a possible selection self-reporting bias in the online survey. Self-reporting bias may result in measurement error as there is a deviation in measurement between self-reported and actual values (Rosenman, Tennekoon and Hill, 2011). The FGD relied on non-probability sampling, which can cause self-selection bias by impacting the extent of the discussions in the focus group. Additionally, this study relied on the reflections of a single educator in one subject in one health profession at one university in South Africa. While these limitations must

be considered, the detailed description of how the study was conducted could be used to reflect on and inform similar outcomes in similar courses.

5.7. Conclusion

This chapter discussed the interpretation of the study's findings and how the conceptual framework guided this interpretation. In order to improve the online content and interactions, the students' perceptions and experiences needed to be considered as they are the ones using the content, and it is for them that we develop, create and organise the content. Using the TAM, CoI model and meta-theory of SRL as a lens to view and interpret the findings, the researcher was able to elevate the importance of the participants' experiences and perceptions of the online content delivered during the Covid-19 pandemic.

The following and final chapter outlines conclusions from the study and its contribution to medical education.

CHAPTER 6. CONCLUSION

6.1. Introduction

In this final chapter, I outline conclusions drawn from this research. I also suggest ways this study contributes to research in medical education.

6.2. Contributions to Health Professions Education

This study emphasises the need for a holistic overview involving all key educational role players. The crisis precipitated by the pandemic highlighted institutions' lack of readiness for large-scale online learning, making it imperative that we heed the lessons offered by the crisis. This study emphasises the importance of learning interaction design and the need for varied and ongoing faculty development to support teachers in their choice of content, pedagogy and online teaching tools and promote meaningful learning. The study further underscores the need for skilled faculty developers and instructional designers to support health professions educators in evaluating the online courses developed during ERL and examining what design components could be retained and improved. The suggestion to explore pedagogical, digital and instructional design competencies of health professions educators stimulated by this study can put health professions educators and researchers on a path to more innovative, authentic and cutting-edge research in HPE. Further opportunities for research include exploring what constitutes effective blended-learning experiences for pre-clinical and clinical medical students. In addition, it would be imperative to interrogate what pedagogical and digital skills health-profession educators require to design more meaningful online content and blended-learning interactions.

6.3. Concluding Remarks

ERL allowed health professions educators to explore their students' experiences and perceptions of online learning during the Covid-19 pandemic. Exploring their

responses allows health professions educators to reflect on their courses and competencies and explore ways to improve and develop their courses. Let us not waste the opportunity to build on the lessons of Covid-19 in health professions education and work towards improved robust educational offerings in the future.

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APPENDICES

APPENDIX A: RESEARCH QUESTIONNAIRE

Questionnaire on REDCap

Section 1.

In 2021, your IPC learning materials were online.

Please select your level of agreement with the following statements about the usefulness of the online learning materials:

1. I was able to access the online learning material easily.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

2. The online learning material was logically organised.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

3. I could access support when needed.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

4. I used the online learning material several times a week.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

5. I accessed the online learning material mainly to identify the content that I needed to learn.
   - Strongly agree
   - Agree
   - Neutral
   - Disagree
   - Strongly disagree

6. I accessed the online learning material mainly to attend tutorials.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

7. I found the online learning material useful for preparing for assessments.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Section 2.

Please select your level of agreement with the following statements about the relevance and application of online learning materials:

8. The topics covered by the tutorials were relevant.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

9. The structure of the learning materials helped direct my learning.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

9a. Please explain your answer to Q9.

10. I felt that the online learning material adequately prepared me to manage patients.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

10a. Please explain your answer to Q10

11. I used the online learning material to identify areas that I need to improve.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Section 3.

Please select your level of agreement with the following statements about the online learning materials and augmentation of clinical skills.

12. The online learning materials introduced me to new clinical skills.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

13. Using the online materials improved my clinical skills competence.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

14. Using the online learning materials helped develop my problem-solving skills.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

15. The skills videos and differential diagnosis construction tasks motivated me to practice my clinical skills in the clinical setting.
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Section 4.

During the 2021 IPC block, you used several formats of learning materials. Which of the following formats would you have liked to use more?

16. I would have liked more video recordings.
    - Yes
    - No
    - Neutral

17. I would have liked more pre-recorded voice-over PowerPoint Presentations.
    - Yes
    - No
    - Neutral

18. I would have liked more quizzes and tests.
    - Yes
    - No
    - Neutral

19. I would have liked more printable resources (guidelines and algorithms)
    - Yes
    - No
    - Neutral

20. I would have liked more live tutorials.
    - Yes
    - No
    - Neutral

21. I would have liked more recordings of live tutorials.
    - Yes
    - No
    - Neutral

22. What aspects of the online IPC learning material did you find challenging? Please explain your answer.

23. What aspects of the online IPC learning material best supported your learning experience? Please explain your answer.

Section 5. Demographics

24. Gender:
    - Male
    - Female
    - Prefer not to state
    - Other:

24a. Since you selected 'Other', please state your gender.

Please select your race:

- Black
- White
- Indian
- Coloured
- Asian
- Prefer not to state
- Other

Since you selected ''Other', please specify your race.

25. Age
    - 21-25
    - 26-30
    - 31-35
    - 36-40
    - >41

26. Accommodation during 2021
    - Family home
    - Own home
    - Private student accommodation
    - University residence
    - Other

26a. Since you selected other, please specify your accommodation.

Thank you for participating in this survey. Your contribution is much appreciated. If you would like to receive a voucher for coffee and a muffin from Olives and Plates at The

Faculty of Health Sciences, University of the Witwatersrand. An independent administrator will administer the vouchers to preserve anonymity.

Cellphone number: _____

Please supply your email address below if you are willing to participate in a 15-minute online focus group on Microsoft Teams as a follow-up to the survey:

Email address (voluntary): _____

Thank you for completing the survey.

Press submit

APPENDIX B: PARTICIPANT INFORMATION SHEET AND CONSENT FORMS FOR FOCUS GROUP DISCUSSIONS

PARTICIPANT CONSENT SHEET

Final year medical students' experiences and perceptions of Integrated Primary Care learning at decentralised training sites during the Covid-19 pandemic: A mixed method study

1. I have been given a Participant Information Sheet which explains the nature and processes involved in this study, which is attached hereto;
2. I was given time to read it, or had it read to me, in the language I best understand;
3. I was given time to ask any questions I wanted to and found any answers given to me to be reasonable and satisfactory;
4. I believe I fully understand why the study is being conducted and what the intended outcomes will be;
5. I understand that there will be no immediate benefit to me, should I agree to participate, nor will I receive any payment; conversely, participation will not cost me anything but my time;
6. I understand that, even if I initially consent to take part in the study, I may subsequently withdraw at any time and would not be required to give any reasons; if that happened, any data collected about me for the purposes of the study would immediately be destroyed, unless I give consent for it to be retained
7. I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study I am free to speak to any of these contacts.

Contact details:

Aviva Ruch, Principal Investigator, telephone no. 011 717 2569, or by email at Aviva.ruch@wits.ac.za,

Ann George, Supervisor, on telephone no. 011 717 2587, or by email at Ann.george@wits.ac.za

Professor CB Penny, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand, on telephone no. 011 717 2301, or by email at Clement.Penny@wits.ac.za.
Ms. Z Ndlovu or Mr Rhulani Mkansi, Committee Secretariat, telephone nos.: 011 717 2700 or 1234, or by email at: Zanele.Ndlovu@wits.ac.za or Rhulani.Mkansi@wits.ac.za

Name of Participant: _____
Date: _____
Place: _____
Signature or mark _____

Witnessed by:

Name of Witness: _____
Signature: _____
Date: _____

CONSENT FORM FOR AUDIO RECORDING OF STUDY PARTICIPATION

Final year medical students' experiences and perceptions of Integrated Primary Care learning at decentralised training sites during the Covid-19 pandemic: A mixed method study

I hereby consent to the audio recording of the interview[1], or focus group discussion[1], or classroom interaction[1]

.

I understand that:

- The recording will be stored in a secure location (a locked cupboard or password protected computer) with restricted access to the researcher and the research supervisor.
- The recording will be transcribed and any information that could identify me will be removed,
- The recordings will be erased within either (a) two (2) years of the publication of the research findings, or (b) six (6) years, if no publications arise from this research
- Anyone wishing to access this information in the future will first have to obtain the approval of the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg
- Direct quotes from my interview, without any information that could identify me, may be cited in the research report or other write-ups of research.

Name of Participant: _____
Date: _____
Place: _____
Signature or mark _____

Witnessed by:

Name of Witness: _____
Signature: _____
Date: _____

APPENDIX C: QUESTIONS FOR THE FOCUS GROUP DISCUSSIONS

Questions to be used in the focus groups

1. What aspects of the online IPC learning material did you find challenging?
    1.1 What did you find the least useful?
    1.2 Why was that?
    1.3 The instructional videos were highlighted as a challenge. Did you experience that?
    1.4 Can you explain more about that?
    1.5 What was the challenge?

2. What aspects of the online IPC learning material best supported your learning experience?
    2.1 What did you find the most useful?
    2.2 How did that particular tool do that?
    2.3 Why do you think that particular tool supported your learning?

3. Most students found that the online tutorials supported learning.
   What was your perception and experience of the online tutorials?
    3.1 Why was that so?
    3.2 Some students said that there were too many live sessions and that it made them feel overwhelmed. Did you feel like that?
    3.3 Why do you think some students felt like that?
    3.4 Some students felt the timing of the tutorials was a problem.
    3.5 How could we have ensured that this was not a problem?

4. Particular topics were highlighted e.g. dermatology as supporting learning
    4.1 Were there particular topics that supported your learning?
    4.2 How did these topics support your learning?

5. A few students said that the content did not prepare them for the MCQs and did not reflect what was assessed
    5.1 Is this how you felt?
    5.2 Do you want to explain more about that?
    5.3 Is your expectation that we only assess what is explicitly taught?
    5.4 What do you think your role in learning is? Or Do you think a students role in learning is only to remember what is taught?
    5.5 Do you want to elaborate on that?

6. Addressing the perception of online learning material adequately preparing you to manage patients.

6.1 Did you feel that it prepared you to manage patients
6.2 Explain what you mean by that?

6.3 One student commented that since there was a lack of practical experience, the material could not adequately prepare you. Do you agree with that?
6.4 Explain that a bit more please?
6.5 Do you think that the online space can give you a practical experience?
6.6 If so, how?
6.7 One student stated that the online material can only help you to manage patients in part, you need to see patients to improve you management knowledge. Do you agree with this perception?
6.8 Why would that be so?

7. Students said that the content was not comprehensive enough
   7.1 Is that your experience?
   7.2 If so, what should be included?

APPENDIX D: ETHICS CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO: Dr A Ruch
Faculty of Health Sciences
Centre for Health Science Education
Unit for Undergraduate Medical Education
Medical School
University

E-mail: Aviva.Ruch@wits.ac.za

CC: Supervisor: Drs A George and J Francis
<Ann.George@wits.ac.za>
and <HREC-Medical Research Office@wits.ac.za>

FROM: Mr Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2011/11/08

REF: R14/49

PROTOCOL NO: **M210938** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)

PROJECT TITLE: *Final year medical students' perceptions of Integrated Primary Care learning at decentralised training sites during the Covid-19 pandemic: A mixed methods study*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

APPENDIX E: STATISTICAL ANALYSES

Item	Responses	Total N (%)	Gender of respondents*				Age of respondents			
			Male n (%)	Female n (%)	Total* N (%)	p-value	21-25 years n (%)	≥26 years n (%)	Total* N (%)	p-value
1. I was able to access the online learning material easily	Strongly Agree	90 (54.9)	33 (37.1)	56 (62.9)	89 (54.3)	0.341	61 (67.8)	29 (32.2)	90 (54.9)	0.418
	Agree	63 (38.4)	19 (30.6)	43 (69.4)	62 (37.8)		39 (61.9)	24 (38.1)	63 (38.4)	
	Neutral	6 (3.7)	2 (40.0)	3 (60.0)	5 (3.0)		5 (83.3)	1 (16.7)	6 (3.7)	
	Disagree	5 (3.0)	0	5 (100)	5 (3.0)		2 (40.0)	3 (60.0)	5 (3.0)	
	Strongly Disagree	0	0	0	0		0	0	0	
2. The online learning material was logically organised.	Strongly Agree	54 (32.9)	21 (39.6)	32 (60.4)	53 (32.3)	0.295	34 (63.0)	20 (37.0)	54 (32.9)	0.482
	Agree	86 (52.4)	28 (32.6)	58 (67.4)	86 (52.4)		54 (62.8)	32 (37.2)	86 (52.4)	
	Neutral	18 (11.0)	3 (16.7)	15 (83.3)	18 (11.0)		14 (77.8)	4 (22.2)	18 (11.0)	
	Disagree	6 (3.7)	2 (50.0)	2 (50.0)	4 (2.4)		5 (83.3)	1 (16.7)	6 (3.7)	
	Strongly Disagree	0	0	0	0		0	0	0	
3. I could access support when needed	Strongly Agree	78 (47.6)	28 (36.4)	49 (63.6)	77 (47)	0.805	51 (65.4)	27 (34.6)	78 (47.6)	0.870
	Agree	55 (33.5)	16 (29.6)	38 (70.4)	54 (33)		35 (63.6)	20 (36.4)	55 (33.5)	
	Neutral	22 (13.4)	8 (36.4)	14 (63.6)	22 (13.4)		14 (63.6)	8 (36.4)	22 (13.4)	
	Disagree	9 (5.5)	2 (25.0)	6 (75.0)	8 (4.9)		7 (77.8)	2 (22.2)	9 (5.5)	
	Strongly Disagree									
4. I used the online learning material several times a week.	Strongly Agree	44 (26.8)	14 (33.3)	28 (66.7)	42 (25.6)	0.892	32 (72.7)	12 (27.3)	44 (26.8)	0.060
	Agree	75 (45.7)	26 (35.1)	48 (64.9)	74 (45.1)		41 (54.7)	34 (45.3)	75 (45.7)	
	Neutral	29 (17.7)	10 (34.5)	19 (65.5)	29 (17.7)		23 (79.3)	6 (20.7)	29 (17.7)	
	Disagree	16 (9.8)	4 (25.0)	12 (75.0)	16 (9.8)		11 (68.8)	5 (31.3)	16 (9.8)	
	Strongly Disagree	0	0	0	0		0	0	0	
5. I accessed the online learning material mainly to identify the content that I needed to learn.	Strongly Agree	51 (31.1)	21 (42)	29 (58)	50 (30.5)	0.338	35 (68.6)	16 (31.4)	51 (31.1)	0.208
	Agree	90 (54.9)	28 (31.5)	61 (68.5)	89 (54.3)		60 (66.7)	30 (33.3)	90 (54.9)	
	Neutral	10 (6.1)	3 (30.0)	7 (70.0)	10 (6.1)		7 (70.0)	3 (30.0)	10 (6.1)	
	Disagree	13 (7.9)	2 (16.7)	10 (83.3)	12 (7.3)		5 (38.5)	8 (61.5)	13 (7.9)	
	Strongly Disagree	0	0	0	0		0	0	0	
6. I accessed the online learning material mainly to attend tutorials.	Strongly Agree	19 (11.7)	6 (33.3)	12 (66.7)	18 (11)	0.323	14 (73.7)	5 (26.3)	19 (11.6)	0.055
	Agree	52 (32.1)	14 (26.9)	38 (73.1)	52 (31.7)		40 (76.9)	12 (23.1)	52 (31.7)	
	Neutral	46 (28.4)	18 (40.9)	26 (59.1)	44 (26.8)		29 (63.0)	17 (37.0)	46 (28.0)	
	Disagree	40 (24.7)	14 (35.0)	26 (65)	40 (24.4)		20 (50.0)	20 (50.0)	40 (24.4)	

Item	Responses	Total N (%)	Gender of respondents*				Age of respondents			
			Male n (%)	Female n (%)	Total* N (%)	p-value	21-25 years n (%)	≥26 years n (%)	Total* N (%)	p-value
	Strongly Disagree	5 (3.1)	0	5 (100)	5 (3.0)		2 (40.0)	3 (60.0)	5 (3.0)	
7. I found the online learning material useful for preparing for assessments.	Strongly Agree	26 (16.0)	8 (32.0)	17 (68)	25 (15.2)	0.982	14 (53.8)	12 (46.2)	26 (15.9)	0.209
	Agree	75 (46.0)	24 (32)	51 (68)	75 (45.7)		47 (62.7)	28 (37.3)	75 (45.7)	
	Neutral	48 (29.4)	17 (35.4)	31 (64.6)	48 (29.3)		33 (68.8)	15 (31.3)	48 (29.3)	
	Disagree	14 (8.6)	4 (33.3)	8 (66.7)	12 (7.3)		12 (85.7)	2 (14.3)	14 (8.5)	
	Strongly Disagree	0	0	0	0				0	
8. The topics covered by the tutorials were relevant.	Strongly Agree	47 (28.8)	13 (27.7)	34 (72.3)	47 (29.4)	0.681	28 (59.6)	19 (40.4)	47	0.150
	Agree	90 (55.2)	31 (34.8)	58 (65.2)	89 (55.6)		56 (62.2)	34 (37.8)	90	
	Neutral	19 (11.7)	8 (42.1)	11 (57.9)	19 (11.9)		16 (84.2)	3 (15.8)	19	
	Disagree	7 (4.3)	2 (40.0)	3 (60.0)	5 (3.1)		6 (85.7)	1 (14.3)	7	
	Strongly Disagree	0	0	0	0		0	0	0	
9. The structure of the learning materials helped direct my learning. (see Fig 1)	Strongly Agree	29 (17.7)	7 (24.1)	22 (75.9)	29 (18.0)	0.541	19 (65.5)	10 (34.5)	29 (17.7)	0.945
	Agree	103 (62.8)	34 (33.7)	67 (66.3)	101 (62.7)		67 (65.0)	36 (35.0)	103 (62.8)	
	Neutral	21 (12.8)	9 (42.9)	12 (57.1)	21 (13.0)		13 (61.9)	8 (38.1)	21 (12.8)	
	Disagree	11 (6.7)	4 (40.0)	6 (60.0)	10(6.2)		8 (72.7)	3 (27.3)	11 (6.7)	
	Strongly Disagree	0	0	0	0		0	0	0	
10. I felt that the online learning material adequately prepared me to manage patients. (see Fig 2)	Strongly Agree	17 (10.4)	6 (35.3)	11 (64.7)	17 (10.6)	0.059	14 (82.4)	3 (17.6)	17 (10.4)	0.373
	Agree	88 (53.7)	24 (27.6)	63 (72.4)	87 (54.0)		55 (62.5)	33 (37.5)	88 (53.7)	
	Neutral	40 (24.4)	13 (33.3)	26 (66.7)	39 (24.2)		24 (60.0)	16 (40.0)	40 (24.4)	
	Disagree	17 (10.4)	9 (56.3)	7 (43.8)	16 (9.9)		12 (70.6)	5 (29.4)	17 (10.4)	
	Strongly Disagree	2 (1.2)	2 (100)	0	2 (1.2)		2 (100)	0	2 (1.2)	
11. I used the online learning material to identify areas that I need to improve.	Strongly Agree	29 (17.8)	11 (37.9)	18 (62.1)	29 (17.7)	0.141	16 (55.2)	13 (44.8)	29 (17.7)	0.593
	Agree	92 (56.4)	24 (26.7)	66 (73.3)	90 (54.9)		62 (67.4)	30 (32.6)	92 (56.1)	
	Neutral	35 (21.5)	16 (47.1)	18 (52.9)	34 (20.7)		24 (68.6)	11 (31.4)	35 (21.3)	
	Disagree	6 (3.7)	2 (33.3)	4 (66.7)	6 (3.7)		3 (50.0)	3 (50.0)	6 (3.7)	
	Strongly Disagree	1 (0.6)	1 (100)	0	1 (0.6)		1 (100)	0	1 (0.6)	
12. The online learning materials introduced me to new clinical skills.	Strongly Agree	6 (3.7)	2 (33.3)	4 (66.7)	6 (3.7)	0.281	4 (66.7)	2 (33.3)	6 (3.7)	0.186
	Agree	37 (22.6)	15 (40.5)	22 (59.5)	37 (23.))		26 (70.3)	11 (29.7)	37 (22.6)	
	Neutral	67 (40.9)	16 (24.6)	49 (75.4)	65 (40.4)		37 (55.2)	30 (44.8)	67 (40.9)	

Item	Responses	Total N (%)	Gender of respondents*				Age of respondents			
			Male n (%)	Female n (%)	Total* N (%)	p-value	21-25 years n (%)	≥26 years n (%)	Total* N (%)	p-value
	Disagree	51 (31.1)	19 (38.0)	31 (62.0)	50 (31.1)		37 (72.5)	14 (27.5)	51 (31.1)	
	Strongly Disagree	3 (1.8)	2 (66.7)	1 (33.3)	3 (1.9)		3 (100)	0	3 (1.8)	
13. Using the online materials improved my clinical skills competence.	Strongly Agree	6 (3.7)	3 (50.0)	3 (50.0)	6 (3.7)	0.007	3 (50.0)	3 (50.0)	6 (3.7)	0.853
	Agree	60 (36.6)	18 (31.0)	40 (69.0)	58 (36.0)		39 (65.0)	21 (35.0)	60 (36.6)	
	Neutral	61 (37.2)	15 (24.6)	46 (75.4)	61 (37.9)		39 (63.9)	22 (36.1)	61 (37.2)	
	Disagree	29 (17.7)	11 (39.3)	17 (60.7)	28 (17.4)		21 (72.4)	8 (27.6)	29 (17.7)	
	Strongly Disagree	8 (4.9)	7 (87.5)	1 (12.5)	8 (5.0)		5 (62.5)	3 (37.5)	8 (4.9)	
14. Using the online learning materials helped develop my problem-solving skills.	Strongly Agree	16 (9.8)	9 (56.3)	7 (43.8)	16 (11.8)	0.035	13 (81.3)	3 (18.8)	16 (9.8)	0.528
	Agree	77 (47.0)	17 (22.7)	58 (77.3)	75 (50.9)		46 (59.7)	31 (40.3)	77 (47.0)	
	Neutral	44 (26.8)	16 (36.4)	28 (63.6)	44 (24.8)		29 (65.9)	15 (34.1)	44 (26.8)	
	Disagree	24 (14.6)	10 (43.5)	13 (56.5)	23 (11.8)		17 (70.8)	7 (29.2)	24 (14.6)	
	Strongly Disagree	3 (1.80)	2 (66.7)	1 (33.3)	3 (1.9)		2 (66.7)	1 (33.3)	3 (1.80)	
15. The skills videos and differential diagnosis construction tasks motivated me to practice my clinical skills in the clinical setting.	Strongly Agree	20 (12.2)	6 (31.6)	13 (68.4)	19 (11.8)	0.857	9 (45.0)	11 (55.0)	20 (12.2)	0.041
	Agree	84 (51.2)	26 (31.7)	56 (68.3)	82 (50.9)		63 (75.0)	21 (25.0)	84 (51.2)	
	Neutral	40 (24.4)	14 (35.0)	26 (65.0)	40 (24.8)		24 (60.0)	16 (40.0)	40 (24.4)	
	Disagree	19 (11.6)	8 (42.1)	11 (57.9)	19 (11.8)		11 (57.9)	8 (42.1)	19 (11.6)	
	Strongly Disagree	1 (0.6)	0	1 (100)	1 (0.6)		0	1 (100)	1 (0.6)	

*'Other' responses were excluded from the statistical analysis by gender

Section 4.

Learning format	Yes n (%)	Neutral n (%)	No n (%)	Total (N)
Video recordings	73 (44.5)	38 (23.2)	53 (32.3)	164
Pre-recorded voice-over PowerPoint Presentations	105 (64.4)	20 (12.3)	38 (23.3)	163
Quizzes and tests	140 (85.4)	12 (7.3)	12 (7.3)	164
Printable resources (guidelines and algorithms)	124 (75.6)	23 (14.0)	17 (10.4)	164
Synchronous / Live tutorials	42 (25.9)	50 (30.9)	70 (43.2)	162
Recordings of synchronous/ live tutorials	74 (45.1)	44 (26.8)	46 (28.0)	164

APPENDIX F: UUME APPROVAL LETTER

From:

Dr Mantoa Mokhachane

Unit of Undergraduate Medical

Education University of

Witwatersrand

To:

Dr Aviva Ruch

Department of Family

Medicine University of

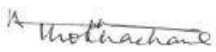
Witwatersrand

Dear Dr Ruch,

Re: GEMP 4 Students Survey

I hereby grant you permission to conduct the survey, subject to the Human Research Ethics Committee and University Registrar's approval.

Yours sincerely



Dr Mantoa Mokhachane

APPENDIX G: TII SIMILARITY REPORT - SUPERVISOR'S LETTER

From: Dr Ann George
Senior Lecturer: Curriculum and Faculty Development
Centre for Health Science Education
Ann.George@wits.ac.za

Dr Joel Francis
Researcher
Department of Family Medicine
Joel.Francis@wits.ac.za

24 June 2023

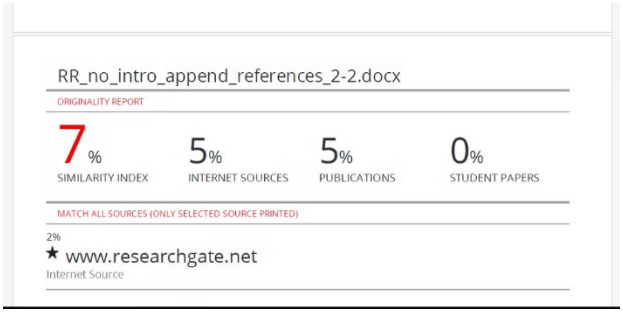
Masters in Health Science Education: Aviva Ruch 8801945P:
Similarity Score of 7%

This letter serves to confirm that Dr Ruch's similarity score of 7% for her MHSE research report (see the next page) derives from ubiquitous phrases, including "learning at the University of the Witwatersrand" and "during the COVID-19 pandemic". Other unavoidable matches relate to one of the models in her conceptual framework ("perceived usefulness" and "perceived ease of use").

Yours sincerely

Ann George
Ann George

Joel Francis
Joel Francis



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ORIGINALITY REPORT

7%	5%	5%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

2%

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